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DRAFT GUIDELINES FOR AREAWIDE WASTE MANAGEMENT PLANNING. SECTION 208, FEDERAL WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972

ENVIRONMENTAL PROTECTION AGENCY

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The Federal Water Pollution Control Act Amendments of 1972 requires the control of point and nonpoint sources of water pollution in meeting the goals of the Act. Section 208 of the Act encourages that all activities associated with point and nonpoint source problems be planned and managed through an integrated areawide waste treatment management program. These draft guidelines apply to those areas with complex problems as designated by the states for Section 208 planning and management. The guidelines are intended to assist the designated local planning agencies for those areas in developing an areawide plan and implementation program consistent with the minimum planning requirements and procedures for obtaining grant assistance set forth in the grant regulations.

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DRAFT GUIDELINES

for

AREAWIDE WASTE MANAGEMENT PLANNING

SECTION 208
FEDERAL WATER POLLUTION CONTROL ACT
AMENDMENTS OF 1972

Environmental Protection Agency
Washington, D. C. 20460
May 3, 1974

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DRAFT

FOREWORD

The Federal Water Pollution Control Act Amendments of 1972 requires the control of point and nonpoint sources of water pollution in meeting the goals of the Act. Section 208 of the Act encourages that all activities associated with point and nonpoint source problems be planned and managed through an integrated areawide waste treatment management program. These draft guidelines apply to those areas with complex problems as designated by the states for Section 208 planning and management.

The guidelines are intended to assist the designated local planning agencies for those areas in developing an areawide plan and implementation program consistent with the minimum planning requirements and procedures for obtaining grant assistance set forth in the ~~proposed~~ grant regulations (40 CFR Part 35, Subpart F). Guidelines for defining the responsibilities of the states in nondesignated areas will be forthcoming.

This draft is scheduled to be revised as appropriate and published as the first edition in late summer of 1974. Any comments and suggested revisions should be addressed to the Planning Assistance Branch, Water Planning Division (AW-454), Office of Water and Hazardous Materials, Environmental Protection Agency, Washington, D. C., 20460.

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Director, Water Planning Division

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CHAPTER 1

INTRODUCTION

1.1 Purpose

The Federal Water Pollution Control Act Amendments of 1972 (hereinafter referred to as the Act) address a myriad of activities for controlling all types of water pollution sources and problems. EPA's overall approach for dealing with these problems and for implementing the requirements of the Act is set forth in the Water Strategy Paper. Section 208 of the Act encourages areawide management planning in areas which, as a result of urban-industrial concentrations or other factors, have substantial water quality control problems. Regulations have been published (40 CFR Part 126) on 208 area and agency designations and proposed (40 CFR Part 35, Subpart F) on 208 planning grant applications. This guideline presents an approach to planning for areawide waste management under Section 208.

1.2 Applicability

This guideline is intended to assist 208 planning agencies in carrying out their areawide waste management planning responsibilities within designated 208 areas. It applies also to other agencies -- local, state, and federal -- that may be involved in the planning process for those areas or in plan review procedures.

1.3 Objectives of 208 Planning

Through Section 208, local areas are provided a unique opportunity to plan and manage a comprehensive program based on integrated planning and control over such activities as municipal and industrial wastewater, storm and combined sewer runoff, nonpoint source pollutants, and land use as it relates to water quality. Through a locally controlled planning agency, an area can select a plan that is cost effective and implementable. Because of the timing of the completion of the 208 planning effort, the plan should be directed to meet the 1983 goals of the Act. It should focus on an integrated approach for identifying and controlling the most serious water pollution problems initially and, over time, resolving the remaining problems, where feasible. Particular emphasis could be placed upon nonstructural approaches to pollution control as a means of reducing the normally large investments associated with traditional structural measures. The area would also choose the management agency or system best suited for assuring implementation of the plan. Periodic review and updating of the plan and management arrangements would enable timely changes in the plan in response to changing conditions and new information within the area. A sound approach to areawide waste management planning should be based upon the above described emphases and characteristics of Section 208. In attempting to set forth such an approach, this guideline incorporates the following basic planning features:

A. Identify problems. The pollution problems should be identified in terms of their relative impact on water quality. Similarly, existing institutional problems impeding solution of water quality problems should be identified.

B. Identify constraints. Both technical and management constraints would be identified.

C. Identify possible solutions to problems. All reasonable regulatory and management control methods would be identified.

D. Develop alternative plans. Alternative integrated technical and regulatory control methods for municipal and industrial wastes, stormwater control, nonpoint source control, and growth and development would be combined into areawide plans. Comparable alternative options for the management of these plans would also be identified.

E. Analyze alternative plans. The alternatives would be evaluated in terms of minimizing overall costs, maintaining environmental, social, and economic values, and assuring adequate management authority, financial capability, and institutional feasibility.

F. Selection of an areawide plan. The selection should be based upon systematic comparison of the alternatives.

G. Periodic updating of the plan. A specific procedure would be defined for monitoring plan effects and developing annual revisions to the plan.

A planning process based on the above approach and elaborated further in these guidelines should achieve the planning objectives of Section 208. In seeking to meet these objectives, planning agencies may use discretion in employing any other logical planning process, as long as that process addresses the major issues of areawide waste management and produces a plan the contents of which are in line with the description set forth in the next section.

1.4 Plan Contents

The broad and integrated coverage of 208 planning means that a range of short and long term objectives must be addressed. Most immediately, 208 planning should look toward such specific outputs as technical requirements for permits, the location of and treatment levels for facilities, initial construction priorities, and feasible measures leading to control of serious nonpoint source discharge problems. The overall contents of a 208 areawide waste management plan are set forth in the 40 CFR 35, Subpart F and summarized below. Consistent with these proposed regulations and based on a systematic comparison of the major alternatives in terms of costs, environmental, social, and economic impacts, and implementation feasibility, a 208 plan will include the following outputs:

A. Identification of anticipated municipal and industrial treatment works construction over a 20 year period.

B. Planning for facilities eligible under 40 CFR 35.917-1(a)-(1) and and 40 CFR 35.1062 and for which Step 2 or Step 3 grant assistance is expected during the five year period following 208 plan approval.

C. Identification of required urban stormwater runoff control systems.

D. Establishment of construction priorities over five and twenty year periods.

E. Establishment of a regulatory program to: 1) provide for waste treatment management on an areawide basis and for identification, evaluation, and control or treatment of all point and nonpoint pollution sources; 2) regulate the location, modification, and construction of waste-discharging facilities; and 3) assure that industrial or commercial wastes discharged into publicly owned treatment works meet applicable pretreatment requirements.

F. Identification of agencies necessary to construct, operate, and maintain facilities required by the plan and otherwise carry out the plan.

G. Identification of nonpoint sources of pollution related to agriculture, silviculture, mining, construction, and certain forms of salt water intrusion, and procedures and methods (including land use requirements) to control those sources to the extent feasible.

H. Processes to control the disposition of residual waste and land disposal of pollutants to protect ground and surface water quality.

I. Selection of a management system to implement the plan and identification of the major management alternatives (including enforcement, financing, land use and other regulatory measures and associated management authorities and practices).

J. A schedule for implementing all elements of the plan, including identification of the costs of implementation.

K. Required certifications relating to consistency with other plans and to public participation in the planning process and plan adoption.

L. Recommendations of appropriate local governing bodies as to state certification and EPA approval of the plan.

1.5 Planning Criteria

Planning for areawide waste treatment management should be directed toward meeting the 1983 goals of the Act within the planning area according to the criteria contained herein.

The Federal Water Pollution Control Act contains specific cost-effectiveness criteria for the planning and development of wastewater management programs in particular as those programs relate to municipal treatment works and controls of combined sewer overflows and storm sewer discharges.

In the conduct of its water program activities, EPA has defined cost effectiveness analysis as an analysis featuring systematic comparison of alternatives to identify the solution which will minimize total costs to society over time to reliably meet given goals or objectives. Total costs to society include resources costs plus social and environmental costs. Thus, the purpose of cost-effectiveness analysis is to select an alternative which efficiently uses the nation's resources in meeting adopted goals while minimizing adverse environmental and social impacts. This guideline recognizes that, pursuant to Section 208(b)(2)(E), costs to society include adverse affects on the local economy. The concept of minimizing total costs to society should be expanded to include minimizing:

- resource costs
- social costs
- environmental costs
- economic costs

Effectiveness refers to meeting the 1983 goals of the Act while providing for the highest practical degree of technical reliability in the pollution control alternative that is chosen.

Explicit criteria for determining adequacy of the management provisions of carrying out areawide waste treatment management are not provided in the Act. This guideline sets forth the following criteria for evaluating adequacy of the management provisions of a 208 plan:

- implementation feasibility and reliability
- public acceptability

The way in which the planning criteria may be applied in plan selection is elaborated upon in Chapters 3 and 13 of this guideline.

CHAPTER 2

PROGRAMMATIC RELATIONSHIPS AND AUTHORITIES

2.1 Introduction

This chapter summarizes the relationships between (a) planning activities pursued under Section 208 of the FWPCAA and water pollution control measures authorized by other sections of the Act; (b) EPA programs addressed to both the protection of other environmental media (e.g., air) and the promotion of environmentally sound practices (e.g., solid waste disposal); and (c) other areawide management programs.

2.2 Relationships Between Section 208 Planning and Other FWPCAA Provisions

A. Relationship between 208 and 303(e) Basin Plans

303(e) basin plans constitute the overall framework within which 208 plans are developed for specific portions of a basin characterized by complex pollution control problems. Basin plans: 1) provide water quality standards and goals, 2) define critical water quality conditions, and 3) provide waste load constraints. The results of 208 planning will constitute an integral part of these basin plans and the delineation of 208 area boundaries may be facilitated by reference to the applicable basin plan. The 208 area plans are to be certified annually by the Governor as being consistent with applicable basin plans. Level B plans under section 208 may provide input relating to water use and management problems that affect water quality.

B. Relationship between 208 and Facilities Plans

Facilities plans cover the planning and preliminary design portions of plans and studies (Step 1 elements) related to construction of publicly owned waste treatment works. Facilities plans, through the systematic evaluation of alternatives, are intended to assure development of cost effective and environmentally sound municipal waste treatment systems. Thus, in contrast to 208 plans, facilities plans are limited essentially to abatement of pollution from municipal point sources and those industries served or to be served by municipal waste treatment systems.

Facilities plans may be completed or in progress when the 208 areawide planning is undertaken. Such planning should be construed as a step toward and supplementary to the more comprehensive 208 plan.

Features included in approved facilities plans and scheduled for plans and specifications should be considered as "existing" for 208 planning purposes. Generally, other facilities plans and ongoing facilities planning efforts should be reviewed by the 208 agency, and agreements should be reached between the facilities planning and 208 planning entities for coordination of the respective planning efforts, recognizing the land use, growth, and areawide aspects of the 208 planning effort. Such coordination should be accomplished with views toward achieving maximum consistency with the 208 plan without unduly delaying ongoing facilities planning efforts. In general, no facilities planning should be initiated within a 208 area after 208 planning has been undertaken and until a 208 plan has been substantially developed. However, in some cases, such concurrent facilities planning may be justified and approved where urgency of solving a specific problem dictates the need for a shorter-term and more narrowly focused planning effort. Upon completion and approval, the 208 plan will serve as the facilities plan for the designated area. Subsequent applications for grant assistance for municipal treatment works construction including detailed design of specific facilities, preparation of plans and specifications, and actual construction, will be reviewed for consistency with the 208 plan. Also, subsequent detailed designs of specific facilities for which grant assistance is requested must not duplicate the contents of the 208 plan.

C. Relationship between 208 Plans and 402 Permit Program

The 402 National Pollutant Discharge Elimination System permit program is designed to ensure that pollutant discharges will not exceed prescribed levels. The permit system provides an essential tool for implementation of the 208 plans within the framework of the 303(e) basin plans. No permits may be issued for point sources which are in conflict with approved 208 plans since they automatically become part of the overall 303(e) basin plans.

2.3 Relationships between 208 Planning and Other EPA Programs

A. Relationship between 208 Planning and Air Quality Programs

Under the Clean Air Act, ambient air quality standards have been promulgated for the nation. Air Quality Control Regions that have been deemed necessary or appropriate for the attainment and maintenance of ambient air quality standards have been established. The States have the responsibility for adopting plans (SIPs) for implementing the ambient air quality standards. During the 208 planning process, reference should be made to the requirements of the applicable SIP for the Air Quality Control Region or Regions in which the 208 area is located.

If any portion of a 208 area is located within an Air Quality Maintenance Area identified pursuant to 40 CFR 51.12(f), 208 planning efforts should be coordinated with the Air Quality Maintenance Plan development and implementation process. The impact of 208 planning activities on air quality should be considered and complementary air and water management strategies, ensuring that 208 plans are consistent with applicable portions of SIPs, should be promoted.

B. Relationship between 208 and Solid Waste Programs

During the 208 planning process, the State Plans for Solid Waste Management should be examined for recommended organizational and technological solutions pertaining to the 208 area. Local agencies within the planning area which are to have the primary responsibility for regulating and implementing solid waste management controls should be identified. In cooperation with such local agencies, the mutual effects of these programs should be considered and appropriate measures taken to assure compatibility between the water quality management provisions of 208 planning and solid waste management within the area.

2.4 Relationship between 208 Planning and Other Areawide Management Programs

The land use aspects of 208 planning provide a direct linkage with other areawide planning efforts within the area including those supported under the HUD 701 and flood insurance and disaster programs, transportation plans under DOT, and coastal zone management planning under NOAA. The 208 planning should be viewed as providing the water quality component of the comprehensive plan for the area. Consideration of other area planning activities will help ensure that their impact on water quality is incorporated into the 208 planning process and that 208 plans are developed which are mutually consistent with these activities. Such consideration will also facilitate the development of a coordinative relationship between 208 agencies and related agencies which should be carried over into the 208 implementation phase.

CHAPTER 3

PLANNING PROCESS

3.1 Purpose

The purpose of the planning process is to formulate an areawide waste treatment management plan that can be implemented by a 208 management agency. The planning process must integrate both technical needs for pollution control and management arrangements capable of implementing the controls.

The technical planning portion of the planning process is concerned with identifying the priority water quality problems of the area, recognizing any constraints in dealing with the problems, and developing alternatives to achieve water quality goals. The alternative plans may then be evaluated according to the planning criteria discussed in Chapter 1.

Management planning is an essential part of the 208 planning process, and should be conducted concurrently with technical planning. Ultimately, all components of the plan are geared to the implementation phase and dependent upon the development of an effective management plan for their accomplishment. Management planning first identifies existing water quality management problems, such as lack of authority for controlling certain pollution sources as related to areawide waste treatment management. Any constraints on devising an effective management approach must be identified as well. Based upon a management analysis, alternative management systems having the potential for effective water quality management are identified. Finally, such alternatives are analyzed in terms of their feasibility for implementing a given technical plan. Because the feasibility of implementing a plan may depend on acquiring proper authority, it is part of the planning function to insure that the management agency(ies) has adequate legal authority to implement the plan. Accordingly, it is imperative that planning agencies consider management problems and alternative approaches during the initial phases of the planning process.

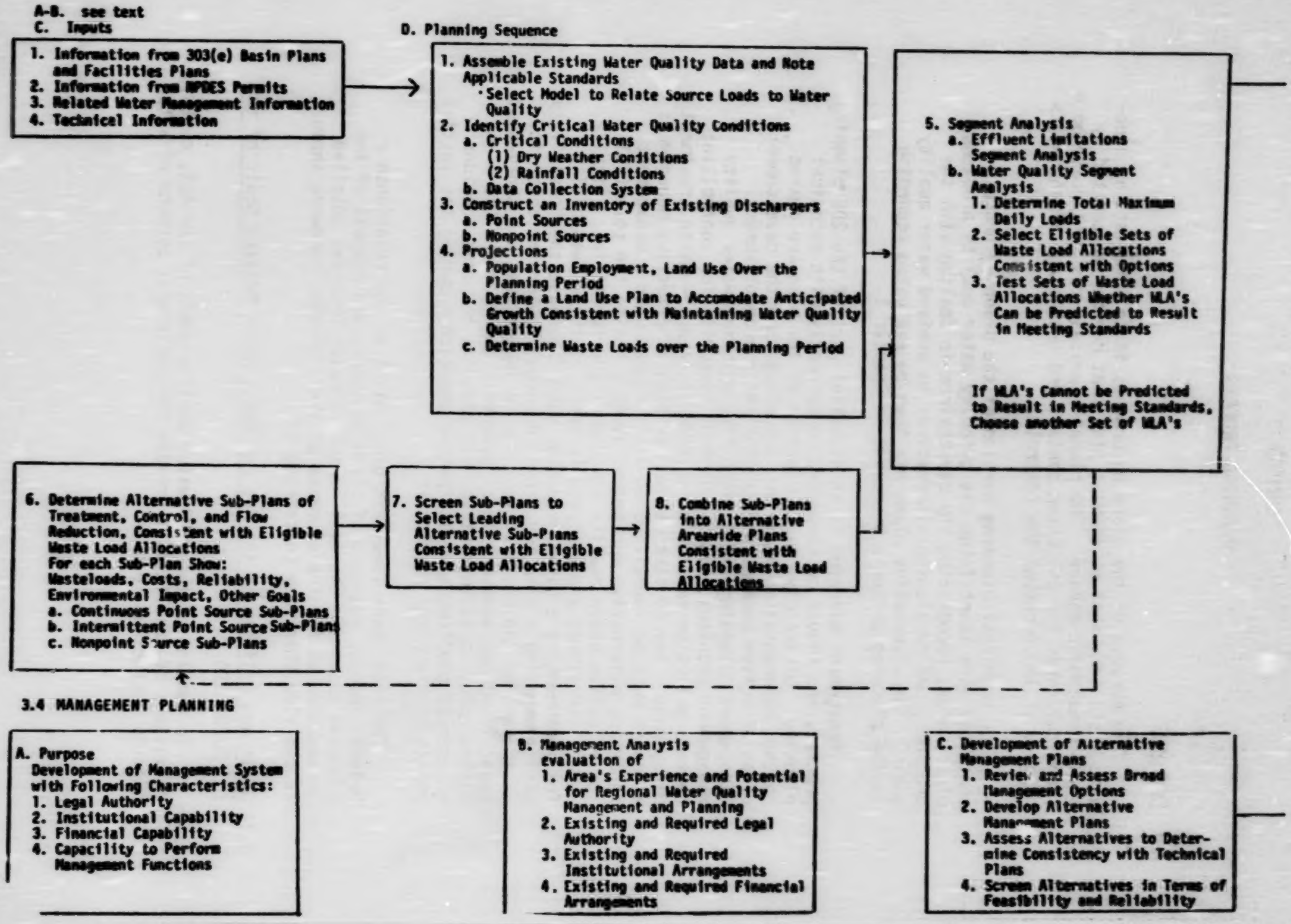
The flow chart (see next page) displays the relationship between inputs, sequence of planning steps, and outputs of the planning process. The text of this chapter provides detailed information on how the elements of the planning framework shown in the flow chart may be carried out.

3.2 Goals and Policies of the Act and Other Water Related Goals of the Planning Area

To complement the 1983 water quality goals of the Act, certain provisions of the Title II provide for additional aspects of water quality protection such as:

AREAWIDE WASTE MANAGEMENT PLANNING - PLANNING PROCESS FLOW CHART

OUTLINE NUMBERS CORRESPOND TO TEXT



3.3 TECHNICAL PLANNING

A-B. see text

C. Inputs

1. Information from 303(e) Basin Plans and Facilities Plans
2. Information from NPDES Permits
3. Related Water Management Information
4. Technical Information

D. Planning Sequence

1. Assemble Existing Water Quality Data and Note Applicable Standards
   - Select Model to Relate Source Loads to Water Quality
2. Identify Critical Water Quality Conditions
   a. Critical Conditions
      (1) Dry Weather Conditions
      (2) Rainfall Conditions
   b. Data Collection System
3. Construct an Inventory of Existing Dischargers
   a. Point Sources
   b. Nonpoint Sources
4. Projections
   a. Population Employment, Land Use Over the Planning Period
   b. Define a Land Use Plan to Accomodate Anticipated Growth Consistent with Maintaining Water Quality Quality
   c. Determine Waste Loads over the Planning Period

5. Segment Analysis
   a. Effluent Limitations Segment Analysis
   b. Water Quality Segment Analysis
      1. Determine Total Maximum Daily Loads
      2. Select Eligible Sets of Waste Load Allocations Consistent with Options
      3. Test Sets of Waste Load Allocations Whether WLA's Can be Predicted to Result in Meeting Standards

If WLA's Cannot be Predicted to Result in Meeting Standards, Choose another Set of WLA's

6. Determine Alternative Sub-Plans of Treatment, Control, and Flow Reduction, Consistent with Eligible Waste Load Allocations
   For each Sub-Plan Show:
   Wasteloads, Costs, Reliability, Environmental Impact, Other Goals
   a. Continuous Point Source Sub-Plans
   b. Intermittent Point Source Sub-Plans
   c. Nonpoint Source Sub-Plans

7. Screen Sub-Plans to Select Leading Alternative Sub-Plans Consistent with Eligible Waste Load Allocations

8. Combine Sub-Plans into Alternative Areawide Plans Consistent with Eligible Waste Load Allocations

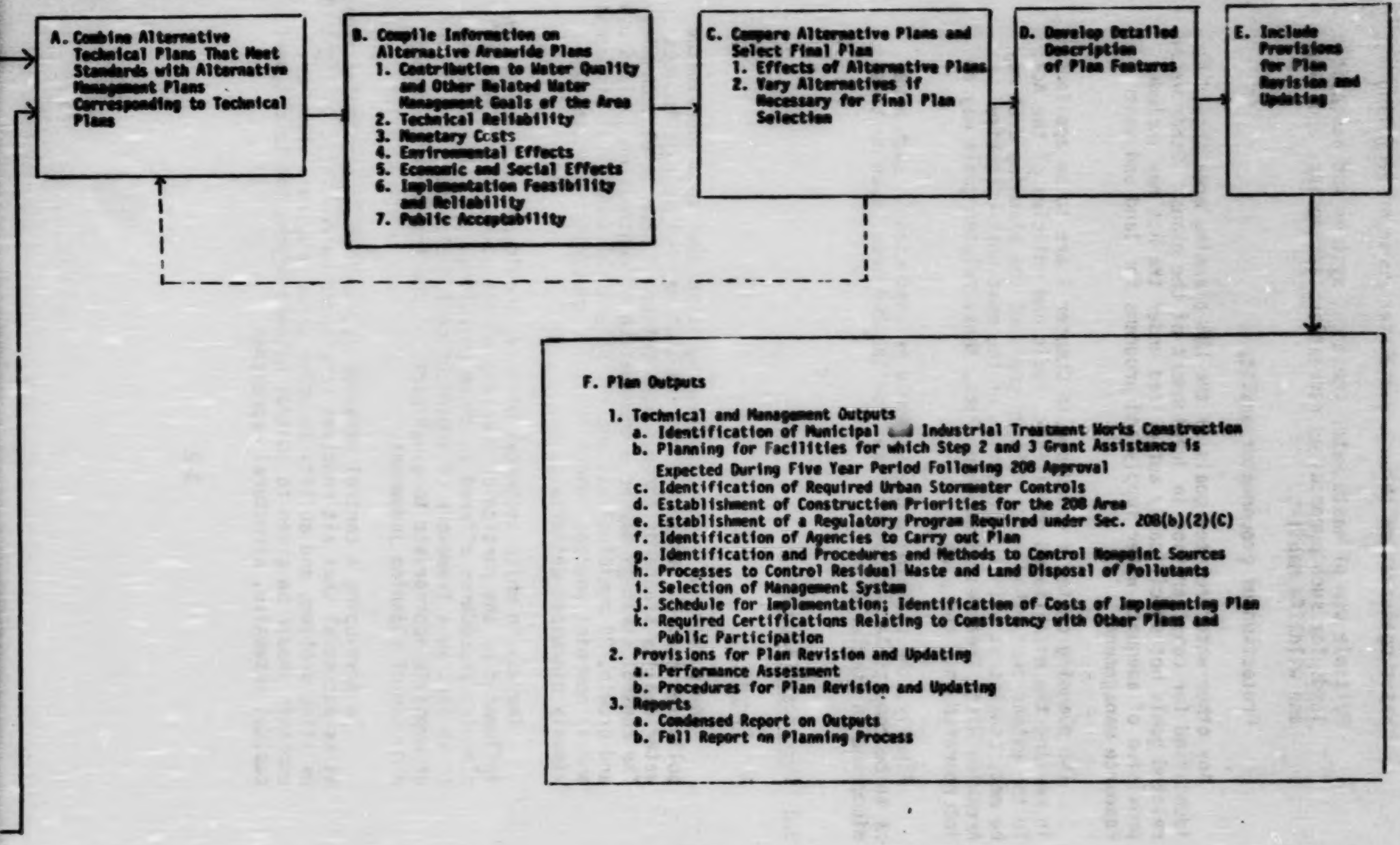
3.4 MANAGEMENT PLANNING

A. Purpose
   Development of Management System with Following Characteristics:
   1. Legal Authority
   2. Institutional Capability
   3. Financial Capability
   4. Capacility to Perform Management Functions

B. Management Analysis evaluation of
   1. Area's Experience and Potential for Regional Water Quality Management and Planning
   2. Existing and Required Legal Authority
   3. Existing and Required Institutional Arrangements
   4. Existing and Required Financial Arrangements

C. Development of Alternative Management Plans
   1. Review and Assess Broad Management Options
   2. Develop Alternative Management Plans
   3. Assess Alternatives to Determine Consistency with Technical Plans
   4. Screen Alternatives in Terms of Feasibility and Reliability

3.5 Combined Plan Evaluation and Selection


A. Combine Alternative Technical Plans That Meet Standards with Alternative Management Plans Corresponding to Technical Plans
B. Compile Information on Alternative Areawide Plans
1. Contribution to Water Quality and Other Related Water Management Goals of the Area
2. Technical Reliability
3. Monetary Costs
4. Environmental Effects
5. Economic and Social Effects
6. Implementation Feasibility and Reliability
7. Public Acceptability
C. Compare Alternative Plans and Select Final Plan
1. Effects of Alternative Plans
2. Vary Alternatives if Necessary for Final Plan Selection
D. Develop Detailed Description of Plan Features
E. Include Provisions for Plan Revision and Updating
F. Plan Outputs
1. Technical and Management Outputs
a. Identification of Municipal and Industrial Treatment Works Construction
b. Planning for Facilities for which Step 2 and 3 Grant Assistance is Expected During Five Year Period Following 208 Approval
c. Identification of Required Urban Stormwater Controls
d. Establishment of Construction Priorities for the 208 Area
e. Establishment of a Regulatory Program Required under Sec. 208(b)(2)(C)
f. Identification of Agencies to Carry out Plan
g. Identification and Procedures and Methods to Control Nonpoint Sources
h. Processes to Control Residual Waste and Land Disposal of Pollutants
i. Selection of Management System
j. Schedule for Implementation; Identification of Costs of Implementing Plan
k. Required Certifications Relating to Consistency with Other Plans and Public Participation
2. Provisions for Plan Revision and Updating
a. Performance Assessment
b. Procedures for Plan Revision and Updating
3. Reports
a. Condensed Report on Outputs
b. Full Report on Planning Process

Water conservation through wastewater reuse or recycling

Multiple use of waste water treatment systems and associated lands for such purposes as recreation, aesthetics, and fish and wildlife habitat.

Protection of groundwater quality

Any other water-related goals of the 208 planning area should be identified for consideration in development of the plans. Other water-related goals not specifically authorized under the Act may include provision of adequate water supply and programs for land and water resource management.

The planning criteria discussed in Chapter 1 are to be applied in meeting the established objectives, goals and policies of the Act. To the extent that other water-related goals of the planning area may be met, consistent with the selection of the most cost-effective Areawide Waste Treatment Management Plan, these related goals may be incorporated into the plan.

Finally, the planning process should be conducted in such a way as to be compatible with other plans for the 208 area, such as those discussed in Chapter 2.

3.3 Technical Planning

A. Purpose

The purpose of technical planning is to develop a coordinated pollution control strategy for areas that may not be able to meet water quality standards through application of base level technology. The control strategy may be a combination of controls on 1) land use and growth, 2) municipal wastewater systems, 3) industrial effluents and 4) nonpoint sources, where feasible, consistent with the previously discussed criteria.

The way in which technical planning should be conducted may be influenced by the particular problems of the given area. Technical planning procedures offered in these guidelines are generalized and to be used as a framework of organization for planning. The degree of emphasis appropriate to given parts of the framework is largely a matter of planning judgement.

In developing a control strategy appropriate to particular areas it is essential that alternatives considered be realistic in light of existing problems and ability to solve those problems. However, emphasis should be given to control methods beyond the traditional capital intensive, structural approaches.

The basic method for developing the technical aspects of the 208 plan is the same as the planning methodology utilized in Sec. 303(e) basin plans. Nevertheless, a detailed investigation is undertaken in the 208 plan to determine whether facilities plans are consistent with the needs of the entire 208 area and whether they properly address storm and combined sewer overflow and sewage and sludge disposal considerations. Finally, 208 technical planning is undertaken in close cooperation with agencies possessing land use planning and control authority in the 208 area.

B. Flow Chart

Many of the steps shown in the flow chart correspond to similar planning steps undertaken as part of the Sec. 303(e) basin plans. The text provided herein elaborates on the meaning of the flow chart and addresses planning considerations of the Sec. 303(e) planning methodology which may be of special concern in developing a 208 plan.

C. Inputs

1. Information from 303(e) Basin Plans and Facilities Plans

Available information from 303(e) basin plans and facilities plans provide the basic inputs for 208 planning. In cases in which detail necessary for developing an adequate 208 plan is not available in the 303(e) basin plan, it will be necessary to obtain additional data.

In general, the total allowable daily load to relevant stream segments that is established in 303(e) plans will be regarded as a given constraint for the 208 plan. Individual discharge allocations provided in the basin plan should be carefully evaluated in terms of their cost-effectiveness in meeting the water quality standards over the planning period.

Facilities plans under Title II of the Act or preceding facility plans under 18 CFR and Sec.3(c) of the Water Quality Act of 1965 should be reviewed and revised if necessary to reflect the areawide emphasis of 208 plans.

2. Information from NPDES Permits

Information on discharges into navigable water available through the National Pollutant Discharge Elimination System should be consulted and terms and conditions of any permits already issued to dischargers should be noted in determining pollution control strategies.

3. Related Water Management Information

Much of the information necessary for developing an effective 208 plan is available from related water management programs and studies may be especially useful in the preparation of a 208 plan:

- Basin Studies under the Water Resources Planning Act of 1965
- Urban Studies of the U.S. Army Corps of Engineers
- Flood Plain Information Studies of the U.S. Geological Survey and the U.S. Army Corps of Engineers
- State and local water supply studies and data
- Other related water management information

4. Technical Information

A bibliography of technical studies as related to the various parts of this guideline is provided at the end of this guideline.

D. Planning Sequence

1. Assemble Existing Water Quality Data and Note Applicable Standards

Since the objective of Sec. 208 plans is to attain and maintain state water quality standards which define the 1983 interim goals of receiving water quality, it is important to determine how revisions to existing water quality standards will be made such as to achieve the 1983 goals of the Act.

The review of water quality standards will occur at least once during each three year period beginning with the passage of the Act. Upon review of standards, recommendation for revision of standards will be considered and adopted. The 303(e) basin plans will then be revised accordingly during the next basin plan review.

It is important that the state be involved in an identification of standards which would meet the 1983 water quality goals. It may be necessary to make certain assumptions concerning the standards which would correspond to the 1983 goals prior to state adoption of such standards. Any assumptions adopted for the purposes of 208 planning should be made explicit.

Select a Model to Relate Source Loads to Water Quality

Selection of a model enabling prediction of water quality from source load information will be influenced by the type of sources and conditions of water quality for which predictions are undertaken. The properties of different models are discussed in 303(e) guidelines.

2. Identify Critical Water Quality Conditions

a. Critical Conditions

Critical conditions will vary from basin to basin. Monitoring data provide a basis for choosing critical conditions around which pollution control strategies are designed.

Assumptions concerning critical conditions should reflect careful investigation of basin conditions. Assumptions on the frequency of worst case conditions (e.g. once in 10 yr. 7-day low flow) should be such as to afford maximum protection of biological life in the waters. Survival of a balanced population of indigenous species is the criterion for selection of frequency and duration of worst case water quality conditions, whether the conditions are dry weather or rainfall related.

Choice of critical conditions should consider a range of flow, meteorological and seasonal conditions. In general, for point sources, the conditions under which continuous point source discharges present the worst conditions of pollution are low flow, dry weather conditions. For nonpoint sources which are transported in runoff, critical conditions will be rainfall related, but may occur under a variety of flow conditions.

(1) Dry Weather Conditions

An analysis of the severity of pollution problems associated with dry weather conditions should be conducted. Any dry weather flow conditions (including their duration and frequency) which are critical in terms of maintaining biological life in the waters should be noted.

(2) Rainfall Conditions

An analysis of the severity of pollution problems associated with rainfall related stream conditions (whatever the stream flow prior to rainfall) should be conducted. Any rainfall related flow conditions (including their duration and frequency) which are critical in terms of maintaining biological life in the waters should be noted.

b. Data Collection System

In the case that data from the Sec. 303(e) plan are lacking for certain segments, additional monitoring may be necessary for proper stream classification.

Due to the emphasis of 208 planning on nonpoint sources, and due to the adoption of critical water quality conditions that encompass a range of stream flow conditions, it is quite possible that existing data will be insufficient to enable prediction of whether segments will meet standards under the assumed critical conditions.

Monitoring to the extent necessary to determine nonpoint source load characteristics may be required as an input for the selected stream model. (See Chapter 6).

3. Construct an Inventory of Existing Dischargers

The inventory of dischargers developed in the basin plan should be reviewed in order to identify and locate all significant dischargers.

a. Point Sources

Discharge inventories provided in relevant basin plans should be reviewed and compared with information provided by the National Pollutant Discharge Information System (NPDES). Special attention should be given to adequacy of information on storm and combined sewer discharges. If appropriate, additional monitoring should be undertaken to update available inventory information.

b. Nonpoint Sources

Since nonpoint source control is an integral part of 208 planning, a discharge inventory for all significant nonpoint sources must be constructed (see Chapter 6 Detailed Consideration for Nonpoint Source Control).

4. Projections

In order to plan waste treatment and pollution control over a 20 year period a series of assumptions about population, employment, and land use must be made. Based upon such assumptions and estimates of the wasteload generation characteristics of different activities it is possible to project future pollution control needs.

a. Population, Employment, and Land Use Over the Planning Period

Techniques and data sources for these projections are discussed in 303(e) guidelines. Particular emphasis should be placed on the effect that implementation of the 208 plan, local growth policies, plans for attainment and maintenance of air quality and other regional plans for transportation, solid waste management, water supply or public investment may have in altering historical trends of population, employment, and land use.

b. Define a Land Use Plan to Accomodate Anticipated Growth Consistent with Maintaining Water Quality

An examination of the degree to which existing land use plans provide for water quality protection should be undertaken in cooperation with local agencies possessing land use planning and control authority. Revisions to land use plans recommended as a result of such an examination should be proposed to the agencies possessing land use planning and control jurisdiction. Further recommendations with respect to land use controls that could reduce the overall cost of meeting water quality standards should also be considered in developing the 208 plan. Guidelines on incorporating water quality considerations into land use plans for 208 areas are provided in Chapter 4, Detailed Considerations for Land Use.

c. Determine Waste Loads over the Planning Period

Using data on existing population employment and land use as well as monitoring information, the construction of materials balance for each significant source of pollution should be undertaken so as to relate instream water quality to pollution generation and transport where possible. In the case of nonpoint sources, such a materials balance may be based on average factors for wasteload generation per unit of activity or upon data gathered by adequate monitoring, depending on the nature of the nonpoint source problem in the area. (Refer to Chapter 6).

Utilizing the base line projections and factors of wasteload per unit of activity, future waste loads may be projected. These projections should be for increments of waste for five year periods, covering sources such as residential, commercial, industrial, and nonpoint sources. Further disaggregation into more specific source categories should be undertaken so as to cover each category for which controls are to be planned.

5. Segment Analysis

The basin plan provides for classification of all receiving waters into effluent limited segments or water quality limited segments. It is expected that most stream segments in urban-industrial areas undertaking 208 plans will be water quality limited. Procedures for determining stream classification are presented in 303(e) guidelines.

It should be noted that the development of a 208 plan entails consideration of control options, such as regional waste treatment facilities, which pertain to the entire planning area. Areawide planning may thus alter wasteload projections previously developed under the basin plan, resulting in possible segment classification revision.

a. Effluent Limitations Segment Analysis

In any segments classified as effluent limited application of Best Practicable Treatment is required of all point sources, other than publicly owned treatment works, by July 1, 1977, by which time publicly owned treatment works are required to apply effluent limitations based on Secondary Treatment. By July 1, 1983 point sources other than publicly owned treatment works are to utilize Best Available Technology (BAT), while by such time publicly owned treatment works are to utilize Best Practicable Waste Treatment Technology (BPWTT).

In addition to the requirements to meet BPT/BPWTT, any provisions for anti-degradation adopted in the basin plan should be applied. (refer to 303(e) guidelines)

b. Water Quality Segment Analysis

By definition, water quality segments will be in violation of water quality standards even after all point discharges receive treatment at least as stringent as required by Section 301(b)(1) of the Act. Violation of standards in these segments is caused either by point sources which must be subjected to controls beyond best practicable treatment ("BPT")/secondary treatment or by nonpoint sources which must be controlled. The objective of water quality segment analysis is to determine the most cost-effective allocation of waste loads between all point and nonpoint discharges.

The analysis would be completed for each parameter which is in violation of water quality standards. Each source contributing that parameter to the segment should be identified and alternative remedial measures considered. The final treatment control strategy for the segment should reflect a combination of control methods which will meet water quality standards for all water quality parameters.

(1) Determine total maximum daily loads

Refer to 303(e) guidelines.

(2) Select eligible sets of waste load allocations consistent with options

Refer to 303(e) guidelines. The following are special considerations for determining wasteload allocations as a part of a 208 plan:

- The number of alternative sets of both point and nonpoint individual wasteload allocations should be sufficient for thorough comparison of alternative means for achieving water quality standards according to the criteria of cost-effectiveness.
- In general, point source wasteload allocation will be based on the low flow condition. Nonpoint source load allocations will be based on the incremental load resulting at rainfall-related flow conditions from nonpoint sources, when point sources have been controlled.
- Permit terms and conditions should be investigated so as to allow revision of wasteload allocation when permits are renewed.
- Allocations for future growth should be consistent with the area land use plan and growth projections.

(3) Test sets of waste load allocations to determine whether waste load allocations can be predicted to result in meeting standards

The same model, and considerations relevant in the choice thereof, that was used in Chapter 3.3 D.1 should be used in determining whether wasteload allocations enable meeting standards. For a discussion of the tolerance level which should be used in determining whether wasteload allocations can be predicted to result in meeting standards, refer to 303(e) guidelines.

In general, many causes of uncertainty surrounding the wasteload allocation process will be mitigated by the close coordination between local land use planning and the 208 plan and by the intensive analysis of water quality problems and possible controls in the 208 area.

The choice of a tolerance level for waste load allocations and the reasons for choosing the tolerance level should be made explicit.

6. Determine Alternative Subplans of Treatment, Control and Flow Reduction Consistent with Eligible Waste Load Allocations

Chapters 5 and 6 provide a framework for analyzing pollution control options for point and nonpoint sources. The alternatives that are presented as the result of detailed planning for point and nonpoint sources are referred to as subplans. Each subplan should furnish information on the following:

Wasteload characteristics of each alternative expressed in appropriate units for relating to the water quality prediction model

Total cost of each alternative expressed as its present value or average equivalent value of capital and operating costs for the overall alternative and subsystem components.

Information on the reliability of each alternative and subsystem included in each alternative

Significant environmental effects of each alternative consistent with NEPA procedures, including a specific statement on future development environmental impact

Contribution of each alternative to other water-related goals of the planning area

Subplans may be broken into three major types according to the nature of the sources and their water quality impact. Such a breakdown facilitates relation of the source loads to critical water quality conditions.

a. Continuous Point Source Subplans

Continuous point sources are municipal treatment works and industrial point sources. Detail on this subplan is provided in Chapter 5.

b. Intermittent Point Source Subplans

Intermittent point sources are industrial sources discharging on a seasonal basis and rainfall-related point sources such as storm and combined sewer overflows. Detail on this subplan is provided in Chapter 5.

c. Nonpoint Source Subplans

Nonpoint sources are primarily rainfall-related. Detail on this subplan is provided in Chapter 6.

7. Screen Subplans to Select Leading Alternative Subplans Consistent with Eligible Waste Load Allocations

The number of options of control under each subplan is numerous. Thus, the number of possible subplans may be so great as to impede consideration of logical alternatives. The only subplans that can be implemented are those for which a management alternative to implement the subplans exists. At this stage in the planning process it is important to begin to integrate the results of technical planning and management planning.

At this step, subplans should be narrowed to those subplans that appear to be viable from both a technical and a management perspective. Nevertheless, it is important that the remaining options be sufficiently varied in their approach to resolving the water quality problems of the area so that eventual plan selection can be based upon consideration of a broad range of alternative plans.

8. Combine Subplans into Alternative Plans Consistent with Eligible Waste Load Allocations

At this step viable subplans should be combined into alternative areawide subplans for final evaluation and selection.

This step is not meant to preclude reconsidering options that were previously screened out, but to merely provide a convenient form of organizing a vast number of potential alternatives for pollution control into a reasonable number of alternatives to evaluate.

3.4 Management Planning

A. Purpose

The management planning process must be closely coordinated with the technical planning process. The goal of management planning is to develop a management system capable of implementing the areawide plan. A feasible, reliable, implementable management system will require the following basic characteristics:

1. Adequate legal authority, as mandated by subsection 208(c)(2) and related provisions of the Act. In many cases existing law will be inadequate and supplemental or enabling legislation will have to be passed to provide management agencies with the needed authority prior to the time of plan approval. Detailed discussion of required authority is presented in Chapters 8 and 9.

2. An institutional capability based on a practicable, effective, and coordinated institutional structure. The great variety of local institutions, practices, and experience dictates that a pragmatic strategy be followed in constructing the management system. The system may be comprised of one or more agencies, which may be existing or newly created and local, regional, or statewide in jurisdiction. The system may also incorporate existing or newly created intergovernmental arrangements, which may be State, local, and/or interlocal. Although care must be taken to ensure that the management system fits the local situation, excessive fragmentation of authority and responsibility must be avoided. The plan must assure that management functions can be performed in an effective coordinated manner. Detailed discussion of institutional arrangements is provided in Chapter 8.

3. A financial capability appropriate to the water quality needs and objectives of the area. Flexible, comprehensive financial arrangements must be included in the plan, to enable the management system to meet its responsibilities in such areas as capital construction, operational costs, revenue assessment, and the financing of indirect costs. Financial arrangements are discussed in detail in Chapter 9.

4. Management functions. In undertaking the management portion of the planning process, it is important to keep in mind that "management" includes more than just treatment of wastes. Provision must be made within the management system for the performance of such other essential functions as the administration of stormwater runoff and nonpoint source controls and involvement, through local units of government possessing land use planning and control authority, in the application of land use measures. Financing, regulatory, and enforcement mechanisms associated with these several functions should also be provided for in the plan. The regulatory program is discussed in Chapter 7.

Given the broad range of management functions and probable involvement of several agencies, arrangements, and levels of government, it is useful to approach planning from a systemic perspective. The end result of planning should be a management system capable of overall management of all aspects of water quality control for the area.

This system should make possible an equitable distribution of services, and, at some significant level, must be representative of constituent governing bodies (particularly general purpose governments) having accountability to the electorate. In addition, since planning is fundamental in measuring and contributing to effective performance and since a continuing planning process is to carry over into the plan implementation phase, the planning responsibility may constructively be viewed as a critical element of the comprehensive management system.

Based on the objectives and characteristics outlined above, the management component of the planning process should begin with an analysis of the existing management setting and proceed to the development of alternative management plans correlating with the technical alternatives.

B. Management Analysis

The initial step in the management planning process should be an analysis of the area's experience in water quality management. The purpose of this analysis will be to evaluate the extant capability within the area to meet the management requirements of Section 208 and to develop an understanding of what is needed to satisfy these requirements. Some of the analysis will have been accomplished in the designation and grant application stages. During the planning process, this preliminary assessment should be reviewed and, where necessary, expanded to assure its accuracy and thoroughness. The management analysis touches on a number of overlapping considerations and should provide the following:

1. An evaluation of the area's potential for regional water quality management. This evaluation should seek to assess the effectiveness of regional management to date and the strength of the area's traditions and commitment to regional approaches. The evaluation should incorporate an appraisal of the relationships between federally funded regional planning authorities and regional or local water quality mannagement agencies and between the latter agencies and local agencies (such as transportation, land disposal of wastes, land use planning, and water supply) whose activities impact water quality. The purpose of the evaluation is to help assure that management plans are constructed on a realistic foundation, which reflects the area's experience in regionalized management.

2. An assessment of the specific legal authority required under subsection 208(c)(2) and related provisions to implement the plan, and an approach to acquiring such authority. The approach should delineate what enabling or supplemental

legislation will be necessary, the type of contractual agreements that might be employed, and the possibility for adapting to existing laws. In instances where existing laws might be broadly interpreted as furnishing the required authority, but where such interpretation may be subject to dispute, it will be best to seek specific statutory sanction.

3. An assessment of the extent to which the existing institutional structure, including both agencies and intergovernmental arrangements, is adequate to perform the required 208 functions, and of the type of changes needed (including staffing) to assure functional capability.

4. An evaluation of existing financial arrangements to determine what changes will be necessary to provide the management system with the capacity to meet its financial needs and obligations.

C. Development of Alternative Management Plans

Upon completion of the management analysis, alternative management plans reflecting the results of this analysis should be developed. In most cases, only a limited number of alternatives will be appropriate. Close coordination with the technical planning component of the planning process will be necessary throughout this stage to insure that the management alternatives developed are consistent with alternative technical plans. As an initial step in the formulation of management alternatives, the broad options available with respect to the establishment of a management system should be reviewed and assessed. Careful consideration should be given to the advantages and constraints of these options in relation to the designated area. (The subject of management options is discussed in detail in Chapter 8). Once developed, the management alternatives should be screened in terms of their feasibility and reliability for implementation. Specific feasibility/reliability criteria that should be utilized at this stage (and systematically applied at the time of plan selection) include the following:

1. Legal authority. Determine whether alternative management plans provide for the authority required under 208(c)(2) and related provisions.

2. Operational effectiveness. Evaluate the extent to which the alternatives make possible the effective accomplishment of functions necessary for implementation of a 208 plan.

3. Practicability. Assess the extent to which the alternatives build realistically on existing water quality manage-

ment entities and practices. Determine whether each alternative is an achievable extension of the areas previous efforts in regional water quality management.-- i.e., is it politically feasible?

4. Coordinative capacity. Insure that the alternatives provide processes and mechanisms for resolving conflicts, for balancing needs and resources, and for enforcing the plan. Evaluate their potential for facilitating cooperation with other areawide planning efforts and with local activities that impact water quality.

5. Public accountability. Evaluate the alternatives as to their provisions for ensuring that the management system and its decision making process are accountable for implementing the plan and will be responsible to the area electorate. Insure that the alternatives provide for substantial involvement of general purpose governments and for adequate public participation.

3.5 Combined Plan Evaluation and Selection

A. Combine Alternative Technical Plans that Meet Standards with Alternative Management Plan Corresponding to Technical Plans

Technical planning and management planning should have been carried out in such a way as to result in a series of alternative technical plans for which an alternative management plan to implement the technical plan has been presented. At this step, the alternative technical plans and management plans are simply combined.

For each alternative technical and management plan that are combined into alternative areawide plans, sufficient detail concerning the schedule of actions to be undertaken should be provided to enable accurate evaluation of the plan in terms of meeting 1983 water quality goals.

B. Compile Information on Alternative Areawide Plans

The following kinds of information on effects of alternative plans should be assembled for use in the comparison of alternative plans and selection of an areawide plan:

1. Contribution to Water Quality and Other Related Water Management Goals of the Area. (Information from Chapters 5 and 6)

2. Technical Reliability (Information from Chapters 5 and 6)

3. Monetary Costs (Information from Chapters 5 and 6; methodology for cost evaluation provided in Chapter 10)

4. Environmental Effects (Information from Chapters 5 and 6; methodology for environmental evaluation provided in Chapter 11)

5. Economic and Social Effects (methodology for evaluation of economic and social effects provided in Chapter 11)

6. Implementation Feasibility and Reliability (Information from Chapters 7,8 and 9)

7. Public Acceptability (guidance on means to assure public involvement in the planning process provided in Chapter 12)

Much of the above information is developed in the planning process, which results in the presentation of alternative plans. Some of the above information which may not have been developed in very great detail when alternative plans were being developed, should be gathered in order to be able to proceed to final plan selection. All of the above information may conveniently be assembled on tables such as those provided in Chapter 13.

C. Compare Alternative Plans and Select Final Plan

1. Effects of Alternative Plans

Information on effects of alternative plans should be assembled in tables such as those provided in Chapter 13. Comparison of alternatives and selection of a final plan should be the product of public deliberation over the merits of the different plans under consideration. A discussion of means to involve the public in the overall planning process is provided in Chapter 12. Suggested procedures for public involvement in selection of the final plan are provided in Chapter 13.

2. Vary Alternatives if Necessary for Final Selection

During the plan selection process a variant or composite of alternative plans originally evaluated may be proposed as a final adjustment necessary to pick the most desirable overall plan. The planning process is iterative in nature and thus the reconsideration of an option or subplan should always be undertaken when it may lead to a better overall plan.

D. Develop Detailed Description of Plan Features

In the process of screening, evaluating and selecting plans, it is likely that detailed features of the plan may not have been sufficiently developed to enable implementation of a plan in every detail. At this step, the timing and detailed features of the plan to be implemented should be finalized. A critical path chart depicting sequence of plan implementation steps may be a useful format for depicting the details and schedule of the plans selected for implementation.

E. Include Provisions for Plan Revision and Updating

The 208 plan should cover a 20 year period, be updated as necessary, and must be annually certified by the Governor. The procedure that will be followed in updating both technical and management features of the plan are to be specified in the initial plan submittal.

F. Plan Outputs

1. Technical and Management Outputs

The technical and management contents of a 208 areawide waste treatment management plan have been summarized in Chapter 1.4. The timing for the implementation of the plan should be shown in conjunction with the plan contents.

2. Provisions for Plan Revision and Updating

a. Performance Assessment

The plan should set forth provisions for plan review and performance assessment with regard to meeting the objectives of areawide waste treatment planning.

b. Procedures for Plan Revision and Updating

The plan should include provisions for plan updating over the planning period. The provisions for revision and updating should describe procedures for modifying specific plan elements, and where possible, provide alternative courses of action to undertake, in the event that an originally chosen course of action proves infeasible or inadvisable in the light of changed conditions.

3. Reports

a. Condensed Report on Outputs

A condensed report on the plan should cover all the plan elements required by statute as well as other elements of the plan to be implemented. The report should relate all plan elements to an implementation schedule.

b. Full Report on the Planning Process

A full report documenting the way in which the planning process was carried out should be presented. The format of such a report could follow the outline of the planning process followed in this guideline. This report should serve as an explanation of how the final plan was chosen and what alternatives to the final plan were considered. Pursuant to 40 CFR 35, Subpart F, Section 1064-1 (m-n), the report should provide for:

> "the identification of all major alternative measures, including enforcement activities, financing, land use and other development controls and regulatory actions, administrative and management authorities and practices necessary to carry out each of the alternatives, and selection of the recommended system;"

> "The period of time necessary to carry out the plan and major alternatives, the costs of carrying out the plan, and major alternatives within such time, and economic, social, and environmental impacts of carrying out the plan and major alternatives within such time." This documentation of environmental impacts should satisfy the environmental assessment requirements set forth in 40 CFR 35 Part 6.

CHAPTER 4

DETAILED CONSIDERATIONS FOR LAND USE

4.1 Introduction

This chapter discusses the principal considerations in utilizing and updating existing land use plans and controls to help attain water quality objectives. In addition, for those areas in which land use plans do not exist, consideration will be given to developing land use plans and controls. Such considerations are important for two reasons. First, the land use plan can serve as a basis from which point and nonpoint source controls can be developed and evaluated. Second, consideration of possible changes can be explored as a means of reducing investment in point and nonpoint source control.

4.2 Pertinent Authorizations and Purpose

A. Federal Water Pollution Control Act

§101(b), 201(c), 303, and 314(a)(2) make reference to land use requirements and to the preservation of land resources. The most important authorizations of these subsections indicate that land use regulations should be utilized as methods to control point and nonpoint sources of pollution.

§208 provides that the areawide waste treatment management plan include, "the establishment of a regulatory program to regulate the location, modification, and construction of any facilities within such area which may result in any discharge in such area,. . .." This provides indirect authority for the 208 plan to regulate location of all pollutant dischargers by seeking appropriate changes in land use plans from the agencies possessing land use control jurisdiction in the 208 area. The term "facilities" in §208(b)(2)(c)(ii) includes any controllable source of pollutants, the regulation of which contributes to attaining water quality standards.

A more explicit authority for the 208 plan to consider land use in the 208 area is provided in section 208(b)(2)(F-H) which states that the plan will set forth procedures and methods including land use requirements to control to the extent feasible nonpoint sources of pollution. The term "land use requirements" in section 208(b)(2)(F-H) should include those land use controls (legally permitted uses) and those land management regulations (regulations of activities conducted on land) which contribute to the attainment of water quality standards.

B. Typical State Legislative Authorities

1. Existing land use planning, environmental and conservation laws. When evaluating the land use planning for the area, the planning agency must be cognizant of existing authorities and requirements under a State's environmental, conservation, or land use planning programs. These laws may be applicable to the entire State or just to designated critical areas (e.g., wetlands, floodplains, special interest geographical features, etc.).

2. State enabling laws. An examination of the State statutes relating to the authorities for land use planning and control should be conducted. This will ensure a land use plan that is designed to be implemented within the legal and institutional framework that exists.

4.3 Incorporating Land Use Considerations in the 208 Planning Process

A. Introduction

It is the intent of this section to identify various methods of land use control which the local governments and the management agency in the 208 can utilize to control pollution. This will enable the 208 area to make tradeoffs between structural solutions (e.g., treatment facilities) to pollution problems and nonstructural solutions such as land use, thus increasing the flexibility in the choice of methods used to achieve water quality standards. The 208 planning process seeks to balance all measures of pollution control in such a manner as to achieve the best mix of all measures as determined by direct cost, environmental, social and economic considerations.

The process which is discussed in this chapter for incorporating land use considerations into the 208 planning process is divided into two phases. The first phase focuses on a qualitative assessment of the relationship between land use and water quality. The desired output of this phase is a land use plan and associated controls and policies which can be utilized in the analyses performed in Chapters 5 and 6. The second phase seeks to refine the analyses and outputs of the first phase by suggesting changes and broadly evaluating them according to the criteria of cost-effectiveness.

In both phases, primary reliance will be placed on utilizing existing land use plans and controls. In some cases it may be necessary to update these in order to incorporate changes responsive to water quality objectives. In such cases, the 208 planning agency must work closely with the local governments possessing legal authority for land use planning and controls.

It is also possible that some jurisdictions within the 208 area will not have land use plans and/or controls. In this case, the 208 agency should work with the appropriate jurisdiction to gather enough information about the area so that current and future development patterns and policies can be identified and, if necessary, updated to incorporate water quality objectives.

The land use plan and controls which are the outputs of this chapter should be of sufficient detail to establish the basis for facilities design alternatives and for the evaluation of nonpoint source runoff. More specifically, the plan should be of sufficient detail so that the location, volume, and nature of wastewater flows considered can be identified adequately in order to formulate system or design parameters for the location, sizing, and timing of major transmission systems (laterals and interceptors) and treatment sites. Any specific legal regulations of local land use and development ordinances which affect the assumptions made for the above wastewater and land use impact data should be documented. In addition, the origin of the wastewater sources, their location and geographic distribution should be of a comparable level of detail in order to accurately relate the origin of flows to contributing land uses.

B. First Phase

1. Establishing Land Use and Water Quality Relationships

In recent years a number of studies have been completed which have examined the relationships between land use and water quality. (See bibliography.) Although limited in scope, these studies provide a basis for understanding the impacts land use has on water quality. To the extent that it is practical, land use-water quality relationships should be identified and incorporated into the adjustments of the land use plan.

There are several different methods of approaching the relationship between land use and water quality. One of these is land capability planning. This type of planning relates variations in the physical environment such as soil differences, vegetation, wildlife, etc., to the capability of that environment to assimilate man-made growth and development.

For example, an area may favor the growth and predominance of trees which serve to limit erosion, flooding, and wind velocity. As such, this area may be unsuitable for development. Land capability planning, then, seeks to assess the suitability of a particular area for a specific type and intensity of development (residential, commercial, industrial, etc.).

Another way of viewing the land use water-quality relationship would be to determine the area's water related constraints on growth and development. (Similarly, an estimate of air resources related constraints should be made.) Effective planning would reconcile the capacity of the air and water resources of 208 area with pressures for growth and development.

In order to identify and understand the relationships, some inventorying and analysis of existing conditions should be undertaken. The focus should be on those areas within the 208 region having an impact on or impacted by water quality. Thus, the inventory and analysis may include but not necessarily be limited to the following:

1. Industrial, commercial, residential and other activities from which significant pollution may be generated;
2. Topography and soil conditions of the 208 area;
3. Significant sources of nonpoint source pollution;
4. Bodies of water and related lands that would be beneficially or adversely affected by a change in water quality;
5. Existing waste treatment and collection systems;
6. Solid waste disposal sites;
7. Environmentally sensitive areas:
    - Aquifers and aquifer recharge areas
    - Marshland and wetlands
    - Flood plains
    - Forests and woodlands
    - Erodable and/or poorly drained soils
    - Steep slopes
    - Shorelands.

2. Analysis of Land Use Controls and Practices

In order to successfully implement the 208 plan, it will be necessary to utilize a wide variety of land use controls and practices. It is advisable to review the controls and practices early in the planning process to ensure that they are in conformance with the plan and that they can be utilized in the implementation of that plan, especially in controlling nonpoint sources. The implementation of the controls in the management of the plans is more fully discussed in Chapters 7 and 8. Initially, an inventory and analysis of land use controls and practices should be made with particular attention paid to their possible effect in achieving water quality. The analysis of land use-water quality relationships should help determine those controls which could be most effective. This should be supplemented by an inventory and analysis of other ordinances, regulations and policies such as taxation which may have a direct or indirect impact on water quality. At a minimum the following should be reviewed as they apply to the 208 area:

- Zoning
- Flood plain zoning and regulation
- Environmental performance zoning
- Subdivision regulations
- Planned Unit Development regulations
- Buffer zones
- Conservation and scenic easements
- Density bonuses
- Housing codes
- Building codes
- Construction permits
- Development permits
- Transferable development rights
- Hillside development regulations
- Grading regulations
- Taxation policies
- Public works policies
- Public investment policies
- Land conservation policies
- Discharge permits

Any additional regulations which may affect water quality should also be reviewed.

Emphasis should be placed on the analysis of those controls which could have the greatest impact toward achieving water quality standards in the specific 208 area. A number of the studies listed in the bibliography may prove helpful in conducting this analysis.

Any controls which are determined to have a beneficial impact on water quality and are not presently being used should be identified. Appropriate modifications in existing legislation and/or enforcement mechanisms should be suggested. If such controls cannot be utilized, a justification for not using them should be made.

In addition, it should be noted that under the National Flood Insurance Act of 1968 and the Flood Protection Act of 1973, communities must adopt flood plain zoning or other flood plain management measures to become eligible for federally subsidized flood insurance. Any 208 plan must be fully consistent with the constraints mandated by the above laws.

3. Initial Land Use Planning

The analysis of land use-water quality relationships and land use controls and practices should serve as a basis for determining the land use plan which will be used to establish the basis for facilities design alternatives and to evaluate nonpoint source runoff. An additional input will be the population and economic projections developed in Chapter 3 (3.3. D.4). These projections should be disaggregated to show time-related development consistent with the land use plan. The projections should show growth for the fifth, tenth and twentieth year of the planning period disaggregated into subareas (municipal or equivalent area). If these projection patterns appear inconsistent from subarea to subarea, some adjustments could be made among subareas so as to reduce overall investments in point and nonpoint source control by promoting orderly growth within the entire 208 area.

As was previously stated, the intent is to rely primarily on existing land use plans and controls and to update them to help attain water quality standards. However, as previously described, where no plan exists, one must be prepared.

In determining the suitability of this land use plan, the following criteria should be employed:

1) Impact on water quality. Since the achievement of water quality standards is a major objective of the planning process, it is important that this be given careful consideration.

2) Implementation capability. The plan must be implementable especially those sections having a direct effect on water quality. Careful consideration must be given to the land use controls required to carry out the plan, their feasibility, and their relationship to existing and proposed

institutional and financial mechanisms.

3) Consistency with other programs. To the extent that it is practical, the land use plan should be consistent with other programs, policies and plans such as those related to transportation, water supply, capital improvements, air quality, etc.

4) Public acceptance. Since a plan that is unacceptable to the public is unlikely to be implemented, it is essential that serious consideration be given to the public's viewpoint. Appropriate public participation measures are discussed in Chapter 12.

Once a plan has been determined, the basic data and working maps describing that plan should be prepared so that they can be used for the analyses described in Chapters 5 and 6. These would include:

1) A brief narrative description of the proposed land use controls and practices;

2) A justification for not using land use controls, if any, which were determined to have a beneficial impact on water quality.

3) Tables showing population and economic projections for the fifth, tenth, and twentieth year of the planning period disaggregated to the municipal or equivalent level.

4) Working maps depicting growth and densities, disaggregated by subareas and extent of development for the fifth, tenth, and twentieth year of the planning period. These maps should also show existing and proposed solid waste disposal sites.

C. Second Phase

1. Land Use Refinements

As the subplans are developed according to Chapters 5 and 6, it is likely that certain refinements in the land use plan and controls will become evident. For example, additional controls or adjustments to development patterns might be considered as means of reducing investments in point and nonpoint source controls. This is especially important in particular portions of the 208 area where very high levels of point and nonpoint source controls would be needed to meet water quality goals. In those cases, changes in the land use plan should be made when such changes would not result in an overriding increase in non-water quality related costs and in adverse environmental, social and economic impacts.

2. Final Refinements

After the various subplans have been developed, further land use refinements should be considered. These refinements should be evaluated according to the criteria discussed in section 3.B.3 of this chapter. In addition, they should be evaluated according to the criteria of cost-effectiveness discussed in Chapters 1, 5 and 6. The focus of this evaluation should be on the consideration of alternative land use development patterns which have the potential for reducing investments for point and nonpoint control measures. Those changes that result in reductions in such investments should be adopted if practicable from an overall environmental, social, and economic viewpoint. The following questions may prove useful in suggesting some final refinements:

1) Is this the optimum development pattern for water quality?

2) Could the number and magnitude of discharges be reduced if the development pattern was changed?

3) Will the location of discharges have an adverse impact on water quality?

4) Will the timing of discharges have an adverse impact on water quality?

5) Would the implementation of additional land use controls reduce overall investments?

While this final refinement may occur at various places in the planning process, it is preferable to do it at the point where sub-plans are combined into alternative areawide plans consistent with waste load allocations (Chapter 3.3.D.9). If the planning agency feels that the final refinement would more appropriately be conducted at some other point in the planning process, it should do it at that point. However, it should be noted that the final refinement will be of little value if it is done prior to the combination of sub-plans.

CHAPTER 5

DETAILED CONSIDERATIONS FOR POINT SOURCES

5.1 Introduction

Chapter 3 presents the framework for systematic evaluation and selection of pollution control strategies for all sources of pollutants. This chapter describes detailed planning considerations that should be addressed in establishing alternative subplans for control of point sources of pollution. The point sources considered in this chapter are discherges from municipal treatment plants, combined sewer overflows, separate storm sewer discharges, and industrial waste effluents. Disposal of residual wastes, particularly wastewater sludge, and wastewater reuse considerations is also discussed.

The various point source problems and controls are presented separately in the following sections of this chapter. A separate section covers combined sewer overflows and storm sewer discharges because of their intermittant flow characteristics. This chapter stresses balanced consideration of measures other than the traditional capital intensive approaches toward point source control. Consideration of alternatives should encompass all applicable structural and management measures for preventing, abating, reducing storing, treating, separating, recycling, reclaiming and disposing of municipal and industrial wastewater and storm water discharges. The concluding section of this chapter will bring together control options for these sources into alternative subplans for point source controls.

5.2 Municipal Wastewater Facilities

A. Introduction

Planning of municipal facilities within an areawide planning area will provide for cost-effective, environmentally sound, and implementable treatment works, to meet the present needs of the area and will provide a general program for phasing facilities development to meet future needs associated with the expected development related to the overall land use plan. Balanced evaluation of nonpoint source abatement and prevention measures as well as point source measures must precede final selection of the treatment works. Treatment works must meet the applicable requirements of Sections 201(g), 301, and 302 of the Act. As a minimum, facilities plans must provide for application, by 1983, of the best practicable waste treatment technology (BPWTT). Where necessary to meet wasteload allocation constraints, consistent with water quality standards, plans must provide for measures producing further pollutant reductions. The determination of BPWTT, or measures providing for higher treatment levels if needed, is based upon evaluation of technologies included under each of the following waste management techniques:

a. treatment (biological or physical-chemical) and discharge to receiving waters;

b. treatment and reuse;

c. land application or land utilization.

Comparison of the above techniques and determination of BPWTT for a specific case should include management considerations of nutrients in wastewater and sludges, development of integrated (solid, liquid, and thermal) waste facilities, or enhancement of recreation and open space opportunities.

This section covers major aspects of the municipal wastewater facilities planning presented in the EPA document entitled "Guidance for Facilities Planning". More detailed information on facilities planning is contained in that document. In 208 planning areas, special attention should be given to the disposal of sludge from the municipal wastewater system. Sludge disposal has been a problem in many areas and it can be expected to become increasingly more acute in large urban/industrial areas as waste treatment levels increase and development pressures persist.

B. Inventory Existing Conditions and Determine Existing Flows

The existing waste treatment systems must be accurately assessed to establish a basis for planning any systems modifications. Where available, the Section 303 Basin Plans will provide essential information on municipal point sources, waste loads, wastewater flows, and water quality within the planning area. Permitting data would be an additional source of information. At the start of the areawide planning, this data will be reviewed and supplemented as necessary. The assessment of each existing waste treatment system will include a performance evaluation of the treatment plant including plant performance, operating problems, operating personnel, sampling programs and maintenance programs. An infiltration/inflow analysis should also be made in accordance with EPA Guidance for Sewer System Evaluation to determine whether excessive infiltration or inflow exists and, on a preliminary basis, costs of any corrective measures required. Should the analysis determine the existence of excessive infiltration/inflow, a more detailed sewer system evaluation survey will be made to more specifically define the problems and determine the needed corrective measures and their costs. The detailed evaluation survey would not be eligible for grant assistance under the 208 planning grant, but would be eligible for assistance under a construction grant. An inventory of sludge utilization and disposal capability is also needed in order to assure satisfactory management of residual wastes.

C. Estimate Future Waste Loads and Flows

To provide the basis for planning and preliminary design of facilities, forecasts must be made of the future variations of waste loads and the flows over the planning period. As described in Chapter 4, such forecasts should be based upon evaluation of land use plans, economic and demographic growth trends for the planning area; and any growth constraints imposed by air quality implementation plans, zoning restrictions or permit conditions. The effects of selected flow and waste reduction measures, including sewer system rehabilitation to correct infiltration/inflow, must also be reflected in the flow forecasts to permit subsequent calculation of waste treatment system cost reductions.

1. Land Use and Development

Wastewater load and flow projections must conform to the time related development shown on the land use plan eventually adopted for the area (see Chapter 4). The land use plan should provide for consistent uses in flood hazard or environmentally sensitive areas. To avoid or minimize possible induced changes in the growth pattern from that projected from the land use plan, provision of excessive waste system capacities must be controlled.

2. Flow and Waste Load Forecasts

The expected economic and population growth patterns for the planning area, as reflected by the land use plan, must be translated into estimates of wastewater flows and waste loads. A realistic allowance for unpreventable infiltration should be added. The estimated future changes in flows and waste loads from industries to be served by the municipal system must reflect application of EPA pretreatment requirements for existing and new industries plus any expected process changes affecting wastewater and treatment residuals. Wastewater flow forecasts should also include the effects of applying selected combinations of flow and waste reduction measures within the system and allowance for present and anticipated discharges from septic tank pumpages into the systems.

3. Sludge Generation Forecasts

Estimates should also be made of the volumes and compositions of sludge which will be generated from treatment of the projected wastewater. These forecasts would be modified to the different treatment levels that may be inherent in each of the alternative systems considered.

D. Develop and Evaluate Alternatives

The development of facilities systems involves the systematic comparison of many available subsystem and system options. The concept of an areawide plan for municipal wastewater facilities does not necessarily imply a single interconnected waste treatment system for the area. Separate wastewater systems for outlying areas may prove to be more cost-effective, at least on a near-term basis. Subsystem options for each municipal wastewater system being considered should be identified and compatible options combined into preliminary treatment systems for the entire area consistent with the alternative wasteload allocation sets. Using a rough assessment of costs and impacts, these alternative facility plan components should be screened with respect to goal attainment, monetary costs, and environmental, social, and economic effects. Consideration will also be given to legal and institutional constraints and implementation feasibility. Those alternatives found to be unacceptable should be rejected and the remaining alternatives should then be evaluated in detail to develop a limited number of proposals for systematic comparison of other point source controls. Preliminary alternatives featuring each of the previously discussed waste management techniques should be developed unless adequate justification for eliminating a technique during the planning process is presented.

The following paragraphs briefly describe major factors to be considered and procedures to be applied in the development and evaluation of alternative wastewater systems.

1. Flow and Waste Reduction Measures

The Act encourages the use of a variety of methods for reducing both the volume and amount of waste within municipal wastewater systems where such methods are cost efficient. Some of the following measures would not only reduce wastewater loads, but would reduce water supply demands as well.

a. Infiltration/inflow reduction by sewer system rehabilitation and repair and elimination of roof and foundation drains.

b. Household water conservation, measures, such as household water saving appliances and fixtures as well as designing more appliances for less water consumption.

c. Water and wastewater rates that impose costs proportionnal to water used and wastewater generated and use of water meters.

d. Educating the public on the value of their water resources in order to reduce their consumption.

2. Industrial Service

Municipal waste treatment systems should be planned to serve industrial users of the area whenever practicable and cost effective. Special requirements, issues, and procedures associated with industrial use of a municipal system are covered in Section 5.4.B of this chapter.

3. Sewers

Planning of a waste treatment system includes the comparison of alternative arrangements of interceptors and collection pipes, including phased development, to assure selection of a cost-effective configuration. In developing portions of the planning area, the capacities of the system, in particular the larger lateral and interceptor sewers, should generally accomodate not more than the 20-year wastewater projection based upon the land use plan. However, choice of interceptor and collection pipe sizes should reflect cost-effective analysis of alternative pipe sizes over the planning period. The arbitrary practice of designing interceptors for long term projected growth or ultimate development within the service area should be discouraged. Consideration should be given to interim (short term) treatment works for outlying areas or to septic tank units for individual or clustered developments in low density areas as alternatives to immediate construction of interceptors serving such areas.

4. Waste Management Techniques

Alternative waste management techniques must be evaluated to determine the BPWTT for meeting applicable effluent limitations including those related to wasteload allocation. Information pertinent to this evaluation is contained in an EPA document entitled "Alternative Waste Management Techniques for Best Practicable Waste Treatment" (Proposed in March 1974). Selection of a waste management technique relates closely to effluent disposal choices. Preliminary alternative systems featuring at least one technique under each of the three categories below (treatment and discharge, wastewater reuses, and land application or land utilization) will be identified and screened. A more detailed proposal will be prepared for each unless adequate justification for eliminating a technique during the screening process is presented.

Published cost, performance, and other information is available for many alternative treatment technologies. Preliminary screening of these technologies involves interrelating the costs and relative treatment capabilities of each.

a. Treatment and Discharge

Treatment and discharge techniques include the following:

(1) Biological treatment including ponds, activated sludge, trickling filters, processes for nitrification, and denitrification.

(2) Physical-chemical treatment including chemical flocculation, filtration, activated carbon, breakpoint chlorination, ion exchange, and ammonia stripping.

(3) Systems combining the above techniques.

b. Wastewater Reuse

In comparing waste management techniques and alternative systems, wastewater reuse applications should be evaluated as a means of contributing to local water management goals. Such applications include:

(1) Industrial processes

(2) Groundwater recharge for water supply enhancement or preventing salt water intrusion

(3) Surface water supply enhancement

(4) Recreation lakes

(5) Land reclamation.

Wastewater reuse needs should be identified and defined by volume, location, and quality. These needs may influence the location of the treatment facilities, the type of process selected, and the degree of treatment required.

c. Land Application

The application of wastewater effluents on the land involves the recycle of most of the organic matter and nutrients by biological action in the soil plus plant growth for the breakdown and disposal of nutrients. Such treatment generally provides a high degree of pollutant removal. Planning of the land application techniques should reflect criteria and other information contained in the EPA document on "Alternative Waste Management Techniques for Best Practicable Waste Treatment".

Land application techniques include:

(1) Irrigation including spray, ridge and furrow, and flood.

(2) Overland flow.

(3) Infiltration-percolation.

(4) Other approaches such as evaporation, deep well injection, and subsurface leach fields.

5. Residual (Sludge) Management

Closely aligned with the evaluation of each waste management technique is the management of the residual wastes. This includes the evaluation of alternative combinations of sludge processing and sludge utilization techniques for satisfactorily and economically disposing of the quantities of residual wastes. Care must be taken to assure that the areawide waste management activities do not appreciably add to air quality or water quality problems due to sludge processing and diposal.

A variety of sludge processing and utilization techniques are available including (a) thickening, (b) chemical conditioning, (c) chemical stabilization, (d) aerobic and anaerobic digestion, (e) dewatering, (f) thermal processing for volume reduction or drying, (g) composting, and (h) land spreading as a soil conditioner. Sludge disposal options are limited primarily to land disposal, and land utilization and incineration, and must comply with the EPA policy statement on acceptable methods, based on current knowledge, for the ultimate disposal of sludges from publicly owned wastewater treatment plants.

Some disposal techniques such as soil conditioning and land utilization realize the nutrient value of sludge as fertilizer. They should be given special attention in the adoption of a sludge disposal program for the area. Furthermore, the consideration of incineration should recognize local air pollution control regulations and energy requirements.

6. Location of Facilities

Evaluation and choice of sites for treatment plants, interceptors, transmission lines, outfalls, pumping plants, and other major works should comply with the land use plan. Factors to be considered in such locations include:

a. Possible odor and aesthetic problems

b. Flexibility to convert to possible future reuse and additional pollution abatement needs.

c. Special protection of potable, shellfish, and recreation waters.

d. Avoidance of floodplain and wetland areas, if practicable.

e. Induced growth impacts in flood hazard or environmentally sensitive areas.

7. Regionalization

Regionalization options should be evaluated to assure use of the most cost-effective facilities systems consistent with the areawide waste management needs. Various combinations of treatment plants, interceptors and other works will be identified and consistent with wasteload allocations. The economy of scale associated with a large treatment plant must be balanced with environmental and social impacts, especially if the interconnected system would tend to induce growth patterns that conflict with the land use plan. The effects of streamflow depletion within the area due to the transport of wastewater to a downstream plant location and the impacts of concentrating wastes from plant effluents at fewer points must also be considered.

8. Phased Development

a. General

In examining the cost-effectiveness of a waste treatment system, one important aspect is the alternative of providing sufficient capacity initially to serve the projected needs of the area over the planning period versus meeting those needs with phased development of the systems and modular construction of individual facilities within the system. The phased and modular development options would involve planning to construct facilities and facilities components at intervals throughout the planning period to accomodate projected increases of waste loads and flows. The factors to be considered are:

1. The service life of the treatment works.
2. The incremental costs.
3. The flow and wasteload forecasts.

b. Reserve and Excess Capacity

The planning of waste treatment facilities will normally allow for some excess capacity to allow for daily, wet weather and seasonal flow variations as well as to provide for projected flow increases. The system capacity excess beyond that needed to handle existing average daily flow, however, must be examined from a cost-effective viewpoint. This is particularly true of treatment plants serving areas experiencing growth where phased construction of the capacity may be more cost-effective than the initial construction of that capacity. Also, to equalize daily flow variations, provision of holding storage at the plant intake must be considered.

c. Phased Development of System

Phased development of the system pertaining to sewers and multiple plant systems is advisable in rapidly growing areas; in areas where the projected flows are somewhat uncertain; or where full initial development of facilities would tend to distort growth from that shown on the land use plan for the area. The phasing must be accomplished so as to provide sufficient excess capacity at the beginning of each construction phase to accomodate expected flow increases during the phase. Phasing of the sewers may involve providing for parallel or multiple systems or extention of single lines.

d. Modular Development of Individual Facilities

Modular development of individual facilities, pertaining to components of the wastewater treatment plant, is advisable in areas where high growth rates are projected; where the required degree of treatment must be upgraded later during the planning period; or where existing facilities are to be used initially but phased out later. Modular development would also avoid long term operating problems associated with underutilization of certain components of the plant. Where modular development is used, provisions should be made for future additions during the design of the initial facilities.

9. Flexibility and Reliability

Flexibility and reliability must be considered throughout the planning of municipal facilities. As alluded to in previous sections flexibility factors include possible upgrading of water quality objectives, future application of new technologies, future application of wastewater reuse, modular and phased development of facilities, and temporary treatment plants.

Reliability considerations are important in that there is a risk of failure of any planned wastewater system. With a view toward minimizing this risk, the probability, duration, and impact of such failures will be considered for each system and its components.

5.3 Combined and Storm Sewer Discharges

A. Introduction

The overall objective of this portion of the chapter is to assess pollution problems associated with combined sewer overflow and storm sewer runoff and identify alternative approaches for controlling those problems. Storm sewer discharges and combined sewer overflows can be sources of significant quantities of pollutants. Because they are an integral part of the municipal wastewater collection system, untreated overflows from combined sewers pose an added threat to public health.

Various techniques for controlling and treating combined and stormwater flows can be incorporated into alternative areawide subplans for point sources. Quite often those problems can be substantially reduced through effective control of the sources and/or the runoff before it enters the storm and combined sewer systems as discussed in Chapter 6. The correlation and comparison of the most cost-effective mix of controlling the problems at their source versus controlling the runoff once it enters the confined system can be made in the later steps of the planning process where alternative subplans for point and nonpoint sources are merged into alternative areawide plans. (Chapter 3.3. D.8).

B. Inventory Existing Conditions

The existing combined and storm sewer discharges for the entire area must be accurately assessed to define the nature of the problems. Existing storm and combined sewer systems must be inventoried. Such an inventory should include locations and condition of intake bypasses, pipes, regulatory equipment and other features and an assessment of both the existing performance of the system and its optimum performance with intensive management, operation and maintenance. Such information as the flow variations, design capacities, wastewater constituents, and waste loads are needed. Where flow records are lacking, estimates of overflows and discharges based upon observations should be correlated with rainfall amounts. Wasteload estimates should be based on pollutant sampling and subsequent tests for such parameters as dissolved oxygen (DO), biochemical oxygen demand (BOD), ammonia nitrogen (NH_3-N), total solids (TS), suspended solids (SS), toxics, and both total and fecal coliform counts.

C. Estimate Future Waste Loads and Flows

To provide the basis for planning of possible control measures for combined sewer overflows and storm sewer runoff, forecasts must be made of the waste load magnitude, intensity, and duration of the problems associated with such discharges throughout the planning period. Information obtained on existing discharges can provide a convenient base for the estimates. Flow volumes and waste loads during storm periods should be related to the tributary drainage area. The resulting information can permit forecasting of flow volumes and waste-load increases resulting from future changes in land use and development within the drainage area. Such information can provide the basis for estimating flows in storm sewer systems within the planning area. Adjustments in the projections should be made to account for density changes, reduction in pollutant discharges due to future protection of environmentally sensitive areas as reflected in the land use plan, and probable flow and waste reduction measures both above and withing the sewer systems.

D. Develop and Evaluate Alternatives

The development of alternative areawide control of combined sewer overflows and storm sewer runoff involves the systematic comparison of feasible control options including both structural and nonstructural alternatives. Operational strategies should be explored for the entire system to attempt to maximize the system capacities. EPA research has demonstrated many types of control and treatment techniques, in particular for combined sewer overflows. Among these, storage options both upstream from or within the systems appear feasible. However, such capacity would generally be limited to the most highly polluted initial storm runoff from a low-frequency storm event (one chance in one to one chance in five of being equalled or execeeded during any single year).

Specific factors to be considered in the development and evaluation of combined and storm sewer discharge subplan components are contained in the following paragraphs. In general, the most cost-effective solution will be a mixture of operation/maintenance and construction techniques.

1. Flow and Waste Reduction

A variety of techniques can be used for reducing flow volumes and waste amounts from entering the system. Consideration of these techniques should be coordinated with nonpoint source control options being planned for the tributary drainage area. They include:

a. Reduce disturbance of land cover and maintain surface infiltration capacities.

b. Control patterns and densities of urban development.

c. Reduce nonpoint source runoff through control measures for urban and construction activities.

d. Preservation or management of lands that have natural or existing characteristics for retarding or reducing flow and surface pollutants.

e. Surface runoff and in-system water control measures such as use of permeable material for paving, flow retardation structures, and other means of storing and retarding runoff including planned intermittent shallow flooding of parking areas, streets and other surfaces where damage would be minimal.

In 208 planning, emphasis will be placed on use of the above techniques as alternatives or supplements to the control measures discussed below as the former are generally far more cost-effective and less environmentally disruptive.

2. Alternative Control Techniques

Alternative control techniques that should be considered in combined sewer overflow and storm sewer discharges can be grouped into the following five categories. Although these categories apply primarily to combined sewer overflows, some of them could be appropriate for storm sewer discharges.

a. Separation of sewage and storm collection systems (generally the most costly and least environmentally acceptable approach);

b. Operational control of the existing system, (maximum use of the system storage by computerized flow regulation and subsequent treatment at the plant);

c. Storage at points within the system or at the point of discharge and subsequent treatment;

d. Direct treatment of overflows (in-line high rate treatment methods).

e. High level of maintenance including periodic flushing of sewer systems.

3. Location of Sewer Outlets

Storm sewer capacities are generally related to the potential damage and public inconvenience associated with rainfall events. These sewers usually outlet into nearby waterways that can adequately receive the runoff. Future storm sewer systems anticipated within the planning area should be evaluated together with the existing storm sewer systems.

The cumulative net increase in runoff attributed to these systems should be evaluated to determine the associated effects on flood stages in the receiving waters. More important, from a water quality viewpoint, the waste loads existing and anticipated future storm sewer discharges should be evaluated and compared with the wasteload allocations limits. Where such wasteload allocation limits would be exceeded, an extension or relocation of the outlet sewers to locations where the receiving streams can readily assimilate the wastes may be more cost-effective than developing control measures.

5.4 Industrial Wastewater

A. Introduction

The overall objective of planning for the control and treatment of industrial wastewater is to provide the most efficient approach for serving the present and future industrial wastewater treatment needs for the area. Such treatment needs must meet the applicable requirements of Section 204, 301, 302, 304, 306, 307, and 316 of the Act. Industries served by municipal systems must comply with pretreatment annd cost recovery requirements. Direct discharge of industrial wastes to receiving waters must comply as a minimum, with the provisions of the pertinent Effluent Limitations Guidelines and New Sources Performance Standards. The application of higher treatment levels or internal wasteload reductions will be required where wasteload allocations dictate more stringent restrictions. Applications of higher levels of treatment to meet water quality standards can be mitigated through the restriction of location of future industrial development to areas where receiving waters can more readily assimilate the treated wastewater. Such control of industrial location should be factored into the land use plan and recognize other constraints such as air quality control.

The procedures for evaluating industrial waste sources and problems are basically parallel to those presented in Section 5.2 of this chapter for municipal wastewater systems.

The existing wastewater flows from all major industrial sources should be accurately assessed for the area. Existing information should be used where available including information on those industries that discharge into municipal systems. Such information as average flow-rates, flow variations, seasonal variations, wastewater characteristics and constituents, and mode of disposal are needed as a basis for estimating design flows and wasteload reductions. Particular emphasis should be given to toxic constituents within the wastes and to thermal pollutants present. Forecasts must be made of the future variations of waste loads and flows over the planning period and the discharge locations of those wastes. Such forecasts should be based upon economic and industrial trends, types of industries and constituents of associated wastes, location constraints imposed by the land use plan, and other restrictions imposed by industrial permits and air quality implementation plans. Attention should be given to estimating waste sludges and slurries generated by the industries as well as to the influence that industrial loads will have on treatment plant sludge. The effects of user charges, pretreatment, and effluent limitations guidelines or higher treatment levels on water and wastewater flows should be incorporated into the projections.

B. Develop and Evaluate Alternatives

The development of alternative approaches for treatment of industrial wastes and the degree of treatment involves a systematic comparison of the following options:

a. Pretreatment and discharge of wastewater to municipal systems;

b. Direct treatment by individual industries and discharge of wastewater into receiving waters;

c. Direct treatment and discharge by groups of industries;

d. Reuse of industrial wastewater;

e. Land application.

In conjunction with each of the above options, consideration should be given to discharge to either water or land and to the effects of flow and waste reduction of possible internal recycling and process changes. Various areawide options should be identified in terms of meeting wasteload allocation constraints and compared in terms of a rough assessment of costs and impacts. Consideration should also be given to institutional constraints and feasibility.

Specific issues to be addressed are included in the following paragraphs.

1. Flow and Waste Reduction

Care should be given to accurately assessing the flow and waste reduction as it relates to those industries that discharge or will discharge into municipal systems. The continually more stringent technical and financial requirements on industry should lead to process changes that use less water and create less wastewater. Furthermore, these factors may include inplant recycling with corresponding reductions in wastewater volumes and possibly wasteloads.

2. Minimum Effluent Limitations

Industrial wastewater treatment must comply with the minimum treatment requirements for Best Practicable Control Technology (BPT) and Best Available Control Technology (BAT) by 1977 and 1983, respectively. These treatment requirements are set forth for the industries cited in Section 306 of the Act in a series of EPA documents entitled "Development Document for Effluent Limitations Guidelines and New Source Performance Standards for __________ Point Source Industry". Those guidelines contain criteria by industry for Best Practicable Control Technology Currently Available (known commonly as BPT) and Best Available Control Technology Economically Attainable (known as BAT). The guidelines also provide minimum criteria for New Source Performance Standards and New Source Pretreatment Standards.

3. Joint vs. Separate Municipal and Industrial Facilities

Municipal waste treatment systems should be planned to serve industrial users of the area whenever practicable and cost-effective. Because of the unusual economy of scale associated with larger municipal-industrial facilities, as compared to separate municipal and industrial facilities, a joint system will often be cost-effective. In many cases, however, it may be more economical to have separate industrial treatment facilities because of such factors as characteristics and quantities of industrial waste, industrial pretreatment requirements, and industrial locations and groupings which facilitate joint industrial treatment and/or reuse of industrial wastewater. These considerations are also relevant to the cost and effectiveness of sludge disposal options for each alternative facility.

Industrial use of municipal facilities will be encouraged where total costs (environmental and monetary) would be minimized.

Where industrial flow handled by municipal systems is significant, cost of separate treatment of industrial wastes versus cost of pretreatment plus joint municipal-industrial facilities, should be compared. This involves comparing the incremental cost of the municipal facilities required to transport, treat, and dispose industrial wastes, together with the costs of corresponding pretreatment required, with the cost of separate industrial treatment and disposal facilities of those wastes. In particular, the analysis will cover those industries desiring municipal service but not so served when facilities planning is initiated.

4. Pretreatment and Cost Recovery

Industrial wastes served by municipal systems must comply with industrial pretreatment regulations and cost recovery regulations. The pretreatment regulations basically requires the removal of waste constituents of industrial wastes that are not compatible with the municipal wastewater treatment process. Compatible wastes, generally BOD and suspended solids, can be passed to the municipal treatment plant for treatment. The cost recovery regulations prescribe that industrial users must bear a proportionate share of the cost of operating and maintaining the municipal system together with repayment of the portion of the Federal grant attributed to that waste. Care should be given to selecting industrial sites where receiving waters can more readily assimilate the residual wastes and associated nonpoint source runoff. Such control of industrial locations should be factored into the land use plan and recognize other constraints such as air quality control.

5.5 Other Point Sources

The identification of other point sources within the planning area, possible control options, and feasible controls should be included into point source subplans. In particular, private wastewater systems should be considered and evaluated preferably in conjunction with the municipal wastewater facilities. Generally, these point sources should include those required to obtain permits under the permit program.

5.6 Development of Alternative Subplans

A. Purpose

The alternative subplans for point source controls should correspond to alternative wasteload allocation sets for critical water quality conditions for dry weather and rainfall conditions. At least one subplan must be developed to corresppond to each wasteload allocation set. Subplans for continuous point sources, primarily from municipal and industrial treatment works, must satisfy the critical wasteload allocation sets for dry weather conditions. Subplans for both municipal and industrial treatment works and combined and storm sewer flows during critical intermittent rainfall conditions must correspond to wasteload allocations for combined sewer overflows and storm sewer discharges.

In merging those subplans with similar subplans for nonpoint sources in Chapter 3, various mixes of these subplans can be interrelated and compared in terms of the established criteria for overall plan comparison.

B. Continuous Point Source Subplans

The preparation of point source subplans should correspond to those wasteload allocations established in Chapter 3. For critical dry weather conditions during the course of the subplanning for municipal and industrial wastewater sources, further options for those sources should be explored and reasonable alternatives worthy of consideration should be incorporated into additional wasteload allocation sets. In most instances several alternative subplans can be identified to meet a given wasteload allocation set.

C. Intermittent Point Source Subplans

The preparation of point source subplans for intermittent flows must correspond to wasteload allocations for all point sources, particularly for combined sewer overflows and storm sewer discharges, for critical rainfall conditions. The subplans must each be internally consistent. Generally, the treatment levels for the continuous point sources will not be increased for the intermittent point source subplans. The additional waste treatment requirements will normally be met through control of combined sewer overflows and, where practicable, storm sewer discharges.

D. Disposal of Residual Wastes

The disposal of residual wastes for all point source subplans should conform with an areawide program of areawide solid waste disposal.

E. Screening of Alternatives

Based on comparative evaluation, the most desirable and undesirable aspects of each alternative subplan will be identified and any clearly inferior alternatives will be rejected. In some cases, new alternatives will be identified and formulated. Where necessary to better distinguish their relative merits, the proposals will be refined and their comparisons repeated. This iterative process will produce a limited and manageable number of proposals for final evaluation and public review as a basis for plan selection.

F. Description of Alternatives

Following screening of the system alternatives, the following alternatives should be presented as an input to the systematic comparison of areawide alternatives (Chapter 3).

i. Residual wasteload characteristics of each alternative

ii. Total cost of each alternative expressed as its present value or average annual equivalent value of capital and operating costs for overall alternative and subsystem components

iii. Reliability and flexibility of each alternative and subsystems included in each alternative

iv. Significant environmental effects of each alternative consistent with NEPA including a specific statement on future developmental environmental impact.

v. Contribution of each alternative to other water-related goals of the planning area.

CHAPTER 6

DETAILED CONSIDERATIONS FOR NONPOINT SOURCE CONTROL

6.1 Introduction

Chapter 3 presents the framework for the systematic evaluation of all sources of pollution and selection of alternative control plans for the area. The control plans for an area must identify the nonpoint sources, evaluate their impact on water quality, and delineate measures for their control.

Point sources of water pollution are defined by P.L. 92-500. Nonpoint sources are not defined by the Act but are mentioned in several sections. By inference, the nonpoint sources are the accumulated pollutants in the stream, diffuse runoff, seepage, and percolation contributing to the degradation of the quality of surface and ground waters. Realistically, they include the millions of small point sources that presently are not covered by effluent permits under the National Pollution Discharge Elimination System. Natural sources (seeps, springs, etc.) are also included since there is no ownership to permit.

The runoff, seepage, and percolation from a number of sources must be considered in the development of a control plan for an area. These nonpoint sources include agriculture, construction, mining, silviculture, and urban/suburban areas. Water quality degradation resulting from land and subsurface disposal of residual wastes, salt water intrusion, and hydrographic modifications must also be considered.

6.2 Statutory Requirements

Section 208(b)(2)(F-I) states that a plan prepared under the waste treatment management planning process shall include:

> "A process to (i) identify, if appropriate,...nonpoint sources of pollution ...and (ii) set forth procedures and methods (including land use requirements) to control to the extent feasible such sources."

Further, Section 208(b)(2)(J) and (K) provide that a plan shall include:

> "A process to control the disposition of all residual waste generated in such area which could affect water quality; and

"a process to control disposal of pollutants on land or in subsurface excavations within such area to protect ground and surface water quality;"

6.3 General Approach of Nonpoint Source Control Planning

This chapter describes some of the considerations that should be included in analysis of nonpoint source pollution problems and suggests a systematic procedure for integrating nonpoint source control into areawide plans. The suggested procedure can be divided into three parts:

Problem Analysis

The total nonpoint source contribution to the waters of an area must be identified. The relative impact of nonpoint sources and point sources on the water quality of the area must be evaluated. A general appraisal should be made and reported for all nonpoint sources and a determination made of those sources or category of sources that are significantly affecting the waters of the area.

The significant nonpoint sources must be identified as to type, location, extent, impact on water quality and controlability. The level of planning detail for problem analysis should correspond to the severity of the different nonpoint source problems in the area. The use of monitoring and modeling in nonpoint source problem assessment is discussed further in 6.4 of this chapter.

Goal Analysis

The full delineation of the water quality problems of an area requires that nonpoint sources be considered along with point sources of water pollution. The objective is to evaluate the pollution from both point and nonpoint sources and to integrate a control program for the significant nonpoint sources into an overall water quality protection plan. Nonpoint source controls may be necessary for several reasons:

1. It may not be possible to maintain water quality standards using only the point source controls.
2. It may not be equitable to impose only point source controls.
3. Nonpoint source controls may be the most cost-effective.

Control Selection Process

In evaluating nonpoint source controls, both the technical feasibility of the controls and their cost-effectiveness and feasibility of implementation should be considered. Controls that are generally regarded as being technically feasible are discussed in 6.5 of this Chapter. Procedures for selecting the controls that are most cost-effective and implementable are discussed in 6.6 of this Chapter. Because of the difficulty of determining precise cost-effectiveness of nonpoint source controls, procedure for selection of nonpoint source controls on the basis of estimated cost-effectiveness is also presented in 6.6 of this Chapter.

6.4 Identification and Evaluation of Nonpoint Sources

The nonpoint sources are the sources contributing to water quality degradation in a stretch of water, where that degradation cannot be accounted for by the known point sources. This applies from the largest basin to the smallest sub-basin. It can be expressed as follows:

$$N = (Q+S+D) - (P+I)$$

where:

N = Quantity (mass) of nonpoint source pollutants in terms of a given parameter, under a given critical flow condition

Q = Quantity of pollutants in the water leaving the test area

S = Quantity of settlement and precipitation of pollutant

D = Quantity of decay of nonconservative pollutants

P = Quantity of pollutants discharged by point sources (assumed to be constant under a given critical flow condition)

I = Quantity of pollutants in the water entering the test area

The accuracy of the efforts to evaluate the significance of nonpoint sources will be a function of the accuracy of the data collected. The runoff, seepage, and percolation of pollutants from nonpoint sources is highly dependent on climatic, seasonal, and other variable events. Such occurences as high rainfall, antecedent rainfalls, cropping patterns, street sweeping schedules, time of travel of runoff, scouring and re-entry of pollutants, etc., must be considered in the evaluation. While average conditions shed light on the general situation, an analysis based on high and/or low runoff periods, and covering specific climatic events and seasonal periods, is more likely to provide an accurate evaluation of the significance of each nonpoint source.

The data available in the records of various agencies should be secured and evaluated. These data from such sources as building inspection offices, soil and water conservation districts, planning agencies, etc. can serve to locate many of the potential nonpoint sources of pollutants. Soil survey maps, construction records, urban sanitation records, and other such documents can provide much information for evaluation of the potential for pollution from nonpoint sources. A number of agencies (USGS, water treatment plants, health units, etc.) maintain water quality records. These records should provide insight to the effects of nonpoint sources.

A. Monitoring and Sampling to Identify Nonpoint Sources

In the final analysis, accurate identification of nonpoint sources will necessitate monitoring and, in many cases, field sampling. The comprehensiveness of the monitoring and sampling will depend on the adequacy of existing data, the reliability of nonpoint source prediction models, and the complexity of the nonpoint source problems of the area.

It is not expected that every nonpoint source contribution in the area can be identified in the relatively short timeframe of the initial 208 planning effort. The monitoring and sampling approach needed for nonpoint source identification should determine a schedule of prioritized activities that will enable a given degree of identification of individual nonpoint sources at given points in time. For example, if the total nonpoint source load to the area is 1/3 of the total pollutant load for a given parameter, the monitoring and sampling activities should be aimed at determining a given percent of the nonpoint source load by a given date.

The initial coverage of the monitoring and sampling approach should be influenced by local conditions and available resources. In general, the initial coverage of the monitoring and sampling approach should proceed from two kinds of information. First, known and suspected nonpoint sources such as waste lagoons, septic seepage areas, land fills, spray irrigation areas, major construction sites, urban storm water overflows, etc., should be mapped. Second, instream water quality data which could be related to the specific nonpoint source sites should be evaluated in order to determine whether a given increment of waste detectable in the stream could be attributed to a given nonpoint source. The sum of the wasteloadsthat could be traced back to contributing sources should be a given percent of the total nonpoint source load that is chosen for the initial monitoring and sampling coverage. If the individual nonpoint sources that can be identified do not sum up to that given percent of the total nonpoint source load, then additional data should be collected.

B. Prediction of Nonpoint Source Loads

Monitoring and field sampling is costly and must be conducted over a long time period to construct an accurate set of data on the nonpoint source problem. It is therefore desirable to complement the monitoring and sampling approach with generalized predictions of nonpoint source loads from measurable watershed parameters such as soil type, slope, vegetative cover, land use, etc. Some predictive models have been developed. Guidance on the applicability of these models and the services available from Federal agencies for utilizing the models is discussed in:

> "Methods for Identifying and Evaluating the Nature and Extent of Nonpoint Sources of Pollutants," EPA 430/9-73-014

Additional guidance on prediction models and techniques for nonpoint sources is being developed by EPA and will be available in subsequent guidance.

6.5 Control of Nonpoint Sources

No single control method or set of control methods will be appropriate for all types of nonpoint source problems. Even controls for a particular type of source will vary in their effectiveness for controlling a particular type of source according to geographic location. The controls should be tailored to local conditions if they are to be effective. As with the problem of identifying nonpoint sources of pollution, expertise with the specific types of nonpoint sources and local conditions should be the basis for design of appropriate controls.

The first step in determining necessary nonpoint source controls involves identifying the technically feasible structural controls and the practicable nonstructural controls that are available for particular nonpoint source problems. Control alternatives for particular types of nonpoint sources are described in this section. The control alternatives discussed herein are directed towards types of nonpoint source problems likely to be encountered in urban-industrial areas. References are provided on information concerning nonpoint sources that are more likely to occur in non-urban areas. It is emphasized that these control alternatives are cited as examples and that other viable alternatives, if available, should also be investigated and considered.

In depth information on the various control alternatives may be obtained from the referenced guidance reports for each type of source. In general, controls for nonpoint sources consist of either structural controls or land use and land management controls. The implementation and enforcement of these nonpoint source controls is further discussed in Chapter 7.3.

A. Urban Stormwater Runoff

Water pollution aspects of urban runoff are related to both the quantity and quality of the storm water runoff. When a rain event occurs, the energy of dissipating raindrops dislodges pollutants from street surfaces, roof tops, lawns and other urban sources, causing contaminant particles to become suspended in solution. Subsequent runoff transports the pollutants across urban land, into gutters, and eventually deposits the runoff into receiving waters. The pollutant concentration is greatest at the beginning of a rainfall event and as the rainfall continues, subsequent runoff becomes less contaminated.

Almost every conceivable pollutant has been identified in urban runoff. The more commonly associated urban pollutants include: dust, dirt, pathogens, fertilizers, pesticides, battery acid, rubber, grease, oil, animal and bird droppings, heavy metals, salts, sand, gravel, coal, leaves, paper products, plastics, glasswares, and metals.

The pollutant load in a particular storm runoff depends upon (1) the amount of material which has accumulated or developed on surfaces since the last storm and (2) the efficiency of the working action accomplished by the storm. A direct relationship exists between the cleanliness of the urban environment and the pollutants in storm water runoff.

Measures for controlling the pollution potential from urban storm runoff include:

1. Public cooperation in reducing amounts of street litter; adoption and enforcement of anti-dumping and anti-littering ordinances; and mass public education programs, i.e. "Clean Cities Campaign."

2. Installation of adequate waste receptacles on public streets; street sweeping and other working programs for reducing the accumulation of pollutants on urban streets; roof drainage controls; and use of catch basins to retain the first flush of polluted storm water runoff.

3. Reduction in the indiscriminate use of fertilizers and pest control chemicals.

4. Land drainage modifications for reducing or eliminating the runoff of polluted waste waters; measures to minimize the impact of runoff water containing snow and ice control chemicals. More detailed guidance can be obtained from:

> "Urban Runoff Characteristics" EPA-11024 DQU 10/70
>
> "Water Pollution Aspects of Street Surface Contaminants" EPA-R2-72-081 11/72
>
> "Water Pollution Aspects of Urban Runoff" American Public Works Association; Federal Water Pollution Control Administration WP-20-15 1/69

B. Construction Activities

Construction activities refer to major earth-disturbing operations required for the development of highways, dams, aqueducts, housing tracts, shopping centers, and other facilities. They include stripping of topsoils, grading of slopes, fertilization and vegetation of exposed soils, pest control, and site restoration following construction.

Pollutants generated by construction activities include sediments and chemical and biological materials. They result from erosion of bare soils; careless spillage of materials; increased storm water runoff; excessive use of fertilizers, pesticides, or other materials; and other generally poor "housekeeping" practices which permit pollutants to be transported from the site area by runoff waters. Typical pollutants include:

1. Sediments

Consisting of solid materials, both mineral and organic, sediments form the principal pollutant load resulting from construction activities. Sediment yields from areas of bare soils in construction sites may be several thousands times that derived from vegetated or undisturbed areas. Other pollutants are picked up by these sediment particles in a "piggy back" fashion and are transported from construction areas to receiving water bodies.

2. Chemicals

These materials originate from both organic and inorganic sources. They include petroleum products, pesticides, fertilizers, synthetic organic materials, metals, soil additives, and miscellaneous chemicals used in construction processes.

Petroleum products form the largest group of materials consumed in construction activities. Pollutants result from leaky storage containers, use of oils for dust control, oil spills during transfers or transportation, and discarded oil-laden rags or other materials.

Pesticides are used for control of undesirable plants, rodents, or insects. Improper application methods will result in pollution through direct contact of pesticides with a water body or the drift of these materials into adjacent water bodies.

3. Biological Materials

These pollutants include soil organisms of human and animal origin. Bacteria, fungi, and viruses are involved. Most prevalent where improper sanitary conditions exist, the biological organisms can be pathogenic to humans or animals.

Effective control of nonpoint sources of pollution should be done on a site-by-site basis, should be dependent upon local conditions, and should be initiated during the preliminary stages of a project. It should be considered during site planning and design, as well as during construction operations. Adequate control must include proper maintenance of the measures installed during the life of the facilities construction. Nonpoint source control programs might include:

1. Installing structural and vegetative measures which will protect environmentally sensitive areas of the site.

2. Controlling the velocity and volume of runoff water to prevent erosion and transport of sediments and other pollutants.

3. Diverting runoff and trapping sediment.

4. Requiring that nonpoint source control be considered in construction contracts as well as procedures for the maintenance and inspection of measures installed (require good "housekeeping" practice).

5. Using stage grading, seeding, and sodding procedures.

More detailed guidance can be obtained from:

"Processes, Procedures, and Methods to Control Pollution Resulting from All Construction Activity" EPA-430/9-73-007

C. Hydrographic Modifications

The various modifications that may be made within a body of water, to its banks, or in its drainage area, represent a potential source on nonpoint pollution. Some of the controls for pollution resulting from hydrographic modifications that should be considered are:

1. Channelization

a. Use of impoundments to control flow rather than enlarging channel capacity

b. Use of natural type design to avoid highway type alignment

c. Use of proper materials and design to avoid instability which causes subsequent scour and channel deterioration alignment, capacity, grade, and structural measures

d. Legal/institutional controls to avoid flood damage in flood plains, etc.

e. Structural alternatives - levees, floodways, retarding basins.

2. Water Impoundments

a. Release of poor quality water because of stratification

Multi-levels outlets - dissolved oxygen
Multi-level outlets - temperature
Reservoir mixing
Aeration of releases
Pre-impoundment site preparation

b. Biological stimulation

Plankton and other epilimnetic forms - reduced nutrient levels and chemicals treatment

Rooted types - water level fluctuation, elimination of shallow shoal areas, and chemical treatment

3. **Urbanization**

   a. Regulation of land use to control:

      (1) sources and type of pollutants

      (2) amount and location of impervious surfaces (especially important in aquifer recharge areas)

   b. Waste management and environmental sanitation -- prevention of waste introduction in surface and ground waters

   c. Public education for waste control

4. **Dredging and Dredge Spoil Disposal**

   a. Spoil treatment during dredging operation --chemical treatment (to aid in dewatering) and disposal techniques (floculation, incineration, filtration, etc.)

   b. Productive uses of spoil

      Creation of wildlife habitation areas
      Land Development
      Agricultural land use

More detailed guidance can be obtained from:

"The Control of Pollution from Hydrographic Modifications"
EPA-430/9-73-017

D. Land and Subsurface Disposals of Residual Waste

Disposal of residual wastes on the land and in subsurface sites may result in ground and surface water pollution through gradual flow of liquid pollutants or leaching of solid pollutants from disposal sites. Some of the types of sources and possible control methods for land and subsurface disposal of residual wastes are the following:

1. Land and Subsurface Disposal of Liquid Waste

   a. Pollution from wells, waste, brine, radioactive gas storage

      (1) Site evaluation
      (2) Waste amenability evaluation
      (3) Construction
      (4) Requisite equipment and emergency procedures
      (5) Monitoring well and aquifer response

b. Pollution from other subsurface excavations

(1) Lagoons, basins and pits-siting and design to avoid bypassing natural protective mechanisms

(2) Pretreatment, lining, barrier wells, and outright use bans

c. Septic tank-percolation field systems

(1) Abandonment in favor of sewerage systems

(2) Require approval of installation site and installation by competent professionals

(3) Use of proper operating procedures and maintenance for such systems

d. Sewer leakage

(1) Formulation and modernization of sewer construction

(2) Codes and specifications as a State rather than local responsibility

(3) Internal and external inspection and repair program at five year intervals

(4) Exclusion of the discharge of materials damaging to sewers and/or ground water

e. Tank and pipeline leakage

(1) Use of corrosion-preventing coatings, cathodic protection or internal linings to prevent corrosion-caused leaks

(2) Design of storage sites to contain leaked liquids before soil absorption

(3) Automatic shut-off valves

(4) Recovery of pumping techniques

(5) Inspections and pressure testing

More detailed guidance can be obtained from:

"Ground Water Pollution From Subsurface Excavations"
EPA-430/9-73-012

"Subsurface Water Pollution, A Selected Annotated Bibliography, "Part I Subsurface Waste Injection" and "Part III, Percolation From Surface Sources", EPA

2. Land and Subsurface Disposal of Solid Wastes

   a. Existing Sites

      (1) Compaction of deposited wastes and covering with at least two feet of compacted soil slopes to promote runoff, thereby minimizing infiltration

      (2) Conversion to a sanitary landfill

      (3) Diversion of surface runoff or streams around the fill area

      (4) Establishment of vegetative cover

      (5) Diversion of groundwater

      (6) Extraction and treatment of polluted waters

   b. New Sites

      (1) Diversion of surface runoff or streams around the fill area

      (2) Operation as a sanitary landfill, including daily application of six-inch (minimum) layers of compact cover soil and application of two-foot (minimum) layers of compacted soil as final cover

      (3) Sloping and vegetation of surfaces to promote runoff, rather than infiltration

      (4) Construction of an impervious barrier in the bottom of the fill area

      (5) Collection and treatment of polluted water

      (6) Judicious consideration of hydrogeological conditions in site selection

More detailed guidance can be obtained from:

"Sanitary Land Fill Design and Operation"
EPA SW-65-TS, 1972

"Sanitary Land Fill Facts" SW-4-TS, U. S. Dept. of Health, 1970

"Decision-Makers Quide in Solid Waste Management", Office of Solid Waste Management Programs, 1974.

E. Agricultural Activities

More detailed guidance can be obtained from:

"Methods and Practices for Controlling Water Pollution from Agricultural Nonpoint Sources"
EPA-430/9-73-015

F. Silvicultural Activities

More detailed guidance can be obtained from:

"Processes, Procedures, and Methods to Control Pollution Resulting From Silvicultural Activities"
EPA 430/9-73-010

G. Mining Activities

More detailed guidance can be obtained from:

"Processes, Procedures, and Methods to Control Pollution from Mining Activities
EPA-430/9-73-011

H. Salt Water Intrusion

More detailed guidance can be obtained from:

"Identification and Control of Pollution From Salt Water Intrusion"
EPA-430/9-73-013

Subsurface Water Pollution, A Selected Annotated Bibliography Part II. Saline Water Intrusion,EPA

6.6 Procedure for Selection of Feasible Nonpoint Source Controls to Meet Water Quality Standards and Goals

A. General

Technically feasible nonpoint source controls have been discussed in this Chapter. The selection of controls for nonpoint sources should determine the most efficient means of meeting water quality standards through both point and nonpoint source controls. This requires a determination of the cost-effectiveness of nonpoint source controls and of their implementation feasibility.

It is recognized that information on cost and effectiveness of nonpoint source controls is difficult to determine. In cases in which quantitative information on cost-effectiveness of nonpoint source controls cannot be adequately ascertained, more flexible procedures for estimation and later determination of cost-effectiveness of nonpoint source controls are suggested.

B. Relationship with Land Use Plan

Since land use measures may be undertaken to minimize water pollution problems, these measures may have included certain nonstructural controls of nonpoint sources.

In determining nonpoint source control measures needed to meet water quality standards, any land use measures that reduce generation of nonpoint sources of pollution should be accounted for as an element in the nonpoint source subplan.

C. Procedure for Selection of Controls

1. Cost and Effectiveness of Nonpoint Source Controls

For each category of nonpoint source that is creating water quality problems, all control options that are technically feasible should be presented. For each control option, the cost of the control and the effectiveness of the control in abating the different pollutants (either at their source, or their yield to receiving waters) should be presented. In establishing the cost of nonstructural controls, such cost should be based upon the opportunity cost of the control as discussed in Chapter 10.

2. Representative Data for Cost and Effectiveness

Since the cost and effectiveness of nonpoint source controls depend on the exact circumstances in which the control is utilized, cost and effectiveness vary considerably. For purposes of evaluating cost-effectiveness of nonpoint source controls, data used should represent the cost and effectiveness of the control applied to typical or average situations. This approach is meant to assure that the cost and effectiveness of the control is neither overestimated or underestimated if it is being considered for widespread application. Naturally, if the control is only applicable in very specific situations, data should be representative of the specific situation.

3. Estimation of Cost and Effectiveness Information

Because the precise cause and effect relationship between application of given nonpoint source controls and achievement of a given reduction of wastes to receiving waters is difficult to define, specification of cost-effectiveness of nonpoint source controls may require preliminary estimation.

Once a nonpoint source problem of a given type has been identified in terms of its impact on the receiving waters it should be possible to determine the approximate reduction of the source load that could be obtained through a given control. Since the cost of the control can generally be assessed with some degree of accuracy, the cost-effectiveness estimation enables an overall ordering of the most feasible controls for nonpoint sources.

To the extent that monitoring and sampling information subsequent to the implementation of a nonpoint source control adopted in a 208 plan reveal an inefficient choice of nonpoint source controls, plan revision and updating may be necessary.

4. Develop Nonpoint Source Control Alternatives

It is desirable to compare all alternatives for nonpoint source control. To simplify comparison of alternatives in the technical planning process, a preliminary screening of nonpoint source control options should be conducted. A reasonable number of control options for each nonpoint source category to which a significant nonpoint source problem is attributed in the inventory of dischargers in Chapter 3, should be presented for consideration in the selection of cost-effective waste load allocations. The following information for each such control should be developed:

a. Waste load characteristics of each alternative expressed in appropriate units for relating to water quality prediction model.

b. Total cost of each alternative expressed as its present value or average annual equivalent value as described in Chapter 10.

c. Reliability and flexibility of each alternative

d. Significant environmental effects of each alternative consistent with NEPA

e. Contribution of each alternative to related water management objectives of the 208 plan.

CHAPTER 7

REGULATORY AND FISCAL CONTROLS

7.1 Introduction

The regulatory program constitutes an essential element in the areawide waste management plan. This chapter discusses the requirements of such a program, along with certain regulatory and fiscal approaches that may be involved in implementation of the program.

7.2 Requirements of the Act

208 plans are required by § 208(b)(2)(C) to make provision for the establishment of a regulatory program to:

A. provide for waste treatment management on an areawide basis and for identification, evaluation, and control or treatment of all point and nonpoint pollution sources,

B. regulate the location, modification, and construction of any facilities within the area which may result in any discharge in such area; and

C. assure that industrial or commercial wastes discharged into any treatment works in the area meet applicable pretreatment requirements.

The regulatory program is also affected by §208(b)(2)(F-K), which requires that 208 plans: 1) set forth procedures and methods (including land use requirements) to control to the extent feasible nonpoint pollution sources related to agriculture, silviculture, mining, construction, and salt water intrusion; and 2) establish processes to protect ground and surface water quality through controls on the disposition of residual wastes and on land disposal of pollutants. In addition to the above requirements, §208 (c)(2) is related to the regulatory program through its specification of the legal authority needed by 208 management agencies. This section of the Act is discussed in Chapter 8.

7.3 The Regulatory Program

Previous chapters of this guideline describe a number of land use measures and techniques for the control of point source discharges and nonpoint source pollution. 208 plans are expected to incorporate a balanced selection of these controls, and also a means of administering them. This selection, together with additional management practices and procedures, will represent the regulatory program required for 208 areas.

The land use controls set forth in Chapter 4 and the point and nonpoint source controls discussed in Chapters 5 and 6 provide a basis for, and should be consulted in, the formulation of a regulatory program. Fiscal controls, discussed below, may also be part of such a program.

These several controls represent a combination of direct and indirect approaches, and the mix of appropriate controls may vary from area to area. The various controls are interrelated. Land use measures, for example, may be employed in regulating both point source discharges and nonpoint source pollution. Fiscal controls may affect land use and influence the decisions of individual and groups of discharges. The regulatory program therefore should be viewed as an integrated program.

Once a balanced and integrated set of controls has been selected, the capability to enforce them becomes the primary concern. 208 plans must provide a means of implementing the selected controls. The principal land use measures, such as zoning, building codes, and subdivision regulations, are based on the police power of the State and traditionally are delegated to local jurisdictions. Implementative authority is therefore already available for such measures, although additional authority or changes in the way existing authority is employed may be called for by the plan. The regulation of point source discharges can be accomplished, as noted above, through land use controls and, of course, through the ection 402 permit program and associated monitoring and pretreatment requirements. Implementation of those elements of the regulatory program dealing with nonpoint source controls is more likely to require enabling legislation. Land use measures may, again, be employed in regulating nonpoint sources, but new legislation may be necessary to make controls effective. Such legislation, for example, could provide permitting authority over activities causing nonpoint source pollution. Construction permits may also be employed as measures for controlling such activities. In addition, 208 management agencies may coordinate with other agencies which administer licensing programs or management practices related to nonpoint source pollution.

7.4 Fiscal Controls

In addition to the controls discussed above and in other chapters of this guideline, various fiscal controls may be provided in the 208 plan to augment the required regulatory program. Examples of such controls include the pricing policies of wastewater agencies and taxation policy.

A. Pricing Policy

In discussing cost-effective ways to meet demands for waste water treatment in municipal systems, Chapter 5 mentions methods which can be used to reduce the flow of wastewater or its waste content.

In considering pricing policy in this context, there are two questions. The first, for many areas, is whether or not to meter.

Unless there are meters, charges cannot be assessed for incremental use, and therefore a pricing policy cannot effect flow and waste reduction. Savings from a reduction in water and wastewater flow must be balanced against the costs of metering. The relevant savings and costs apply to both the water and waste treatment systems.

If a decision is made to meter, or to meter certain classes of users, the second question is at what level to set rates. To encourage cost-effective choices on the part of users, economic analysis indicates that at the margin of use, rates should equal marginal costs. Such rates should reflect the incremental cost attributable to flow, the incremental cost of BOD removal, etc.

In practice, and in current guidelines, the emphasis in developing user charges has been on identifying average costs attributable to flow or BOD removal, or removal of other constituents. While rates based on such estimates are not ideal, they have been found effective in inducing wastewater flow reduction and industrial process change.

B. Taxation Policy

The use of differential assessment ratios, where legal, can serve as an inducement to keep land in a non-urban classification for purposes of open spaces or low density. Such a policy permits owners to maintain land in its present use, but does not prohibit its sale for a more intensive use at a later specified date. The policy therefore tends to slow down the rate of development, without completely prohibiting such development. Under such a policy, however, there is no assurance that the most environmentally sensitive areas are given the most protection.

CHAPTER 8

INSTITUTIONAL ARRANGEMENTS

8.1 Introduction

Institutional arrangements for planning and management purposes are a primary concern in the planning process because of the relationship of areawide waste treatment management to the governmental jurisdiction involved in the local area. In most cases, new arrangements will need to be established to adequately relate existing governments of various types and powers to the areawide management agency or agencies. The overall concept to be kept in mind is that of a management system, whether that system is made up primarily of a single agency or plural agencies. Such a system will have functional responsibility not only for planning and waste treatment management but also for the administration of stormwater runoff and nonpoint source controls and for involvement, through appropriate units of local government, in the application of land use control measures. Whatever system is established must have the required capability to implement and update an areawide waste management plan. The system should be a realistic and logical outgrowth of the institutional situation existing at the time planning for the area begins. This chapter discusses management planning from the point of view of what is required by the Act and in terms of optional approaches that may be considered in establishing a management system.

8.2 Requirements to be Met by the Areawide Management System

A. Allocation of Authorities and Need for Enabling Legislation

The specified authorities required by the Act to be vested in a designated agency or agencies within the management system will rarely have been delegated under State law to any one particular governmental jurisdiction or agency in a 208 area. In many situations, changes in State law or new enabling legislation will have to be passed before all authorities can be coordinated as is necessary for carrying out an areawide waste treatment management plan.

B. Required Authority

The required authority is set forth in §208(c)(2) of the Act:

1. §208(c)(2)(A) requires that there must be adequate authority within the management system "to carry out appropriate portions of an areawide waste treatment management plan developed under subsection (b)...."

The contents of the areawide plan are discussed in Chapter 3. From the perspective of the legal capability of the management system to carry out the plan, the plan itself must be checked to ascertain whether each of the local agencies has the legal capability for carrying out the functions assigned to it by the plan and that all required functions have been so assigned.

2. §208(c)(2)(B) requires that the waste treatment management agencies within the management system have adequate authority "to manage effectively waste treatment works and related facilities" in conformance with the plan. In this regard, the broad definition of "treatment works" as set forth in §212(b) and discussed in Chapter 5 should be kept in mind. Management planning must establish some means of coordination among the agencies and arrangements involved in administering the plan so that conflicts can be resolved and the plan can be properly enforced.

3. §208(c)(2)(C) requires that waste treatment management agencies within the management system have adequate authority "directly or by contract, to design and construct new works, and to operate and maintain new and existing works" as required by the plan. Generally, existing agencies already have this authority. However, where such works are to be located outside the immediate geographic jurisdiction or to accept discharge from outside its area, adequate enabling legislation to meet this requirement may have to be enacted. Where approval of a superior agency is required, said approval should be secured before a grant application is made.

4. §208(c)(2)(D) requires that waste treatment management agencies within the management system have adequate authority "to accept and utilize grants, or other funds from any sources, for waste treatment management purposes." Most such agencies have this authority under State law. Where such authority does not exist, enabling legislation will have to be passed. When State law provides that all such grants must pass through a central State agency, the terms of the grant itself in requiring that the funds will go to the designated waste treatment management agency will guarantee that no funds may be siphoned off by the State agency for uses other than those set forth in the application.

5. §208(c)(2)(E) - (G) deals with authority required in relation to financial arrangements. Detailed discussion of this subject is presented in Chapter 9.

6. §208(c)(2)(H) requires that the waste treatment management agencies within the management system have adequate authority "to refuse to receive any wastes from any municipality or subdivision thereof, which does not comply with any provisions of the approved plan." This authority, which may be exercised by an appropriate State agency, will generally be employed in extreme cases as a last resort. Practically, other methods such as negotiation, fines or additional charges, moratoria, and resort to the courts should be utilized so that a situation of complete shut-off can be avoided.

7. §208(c)(2)(I) requires that the waste treatment management agencies within the management system have adequate authority "to accept for treatment industrial wastes." This authority also involves the right to refuse such wastes if they do not meet applicable pretreatment requirements as mentioned in §208(b)(2)(C)(iii). Other grounds for refusal would exist when such industry is not in compliance with the areawide plan or when applicable State or national laws relating to discharge are being violated.

The required authorities set forth above should be carefully checked with the extant statutory authority. Where, due to either gaps in the statutes or judicial decisions related thereto, there are doubts as to the statutory basis for any of the required authorities, changes in those statutes should be made so as to grant express authority to the areawide waste treatment management agencies to carry out the functions required. In instances where legal authority is open to interpretation, it may also be helpful to solicit and include in the plan submittal an opinion from the State Attorney General.

8.3 Optional Approaches to an Areawide Management System

A. Responsibilities Performed Within the Areawide Management System

The responsibilities that must be assumed by the areawide management system can be summarized under three types (1) coordination, (2) planning, and (3) management.

1. Coordination

As noted above, the management system must be provided with some means of insuring that the system's different functions are being performed on a coordinated basis and in compliance with the areawide plan. The coordinative authority may take a variety of forms and involve several levels of government. Existing agencies such as regional councils, procedures such as the A-95 review, mechanisms such as intergovernmental contracts, agreements, and memoranda of understanding may serve in a coordinative capacity. The State may also play a coordinative role. Another approach to coordinative management would be to provide regional sewage treatment agencies which allocate wasteloads for a 208 area with review and approval authority over land use decisions that will result in significantly exceeding wasteload allocations. Such authority could also be lodged in other regional or State agencies, or in a newly created commission representative of constituent jurisdictions. Whatever approach is taken, the essential consideration is that coordinative authority capable of facilitating the resolution of conflicts and implementation of the plan be a central component of the management system.

2. Planning

208 planning constitutes an integral part of the comprehensive planning process for the area. Once implementation of the initial 208 plan has begun, it will have to be updated both to maintain consistency with the comprehensive plan and to make changes required by changing conditions and by the need to accomplish the water quality objectives of 208 planning. Thus planning will be an important element in the overall 208 management system and a continuing planning process should be provided for in the implementation phase.

3. Management

Management, in the traditional operational sense of the term, includes responsibility for facilities design, construction, operation, and maintenance; for administration and financing; and for implementation of the regulatory program. Agencies exercising these responsibilities should be expected to provide both inputs and feedbacks to the planning process.

B. Optional Allocation of Responsibilities

The allocation of responsibilities of the management system among local agencies will probably depend upon which and how many local governmental jurisdictions either operate waste treatment systems or exercise authority over land use, stormwater runoff, and nonpoint source controls. A survey of the literature of local government may be made for a comparison of various approaches used in different areas. Generally, whatever allocation plan is adopted will probably be a variant of one of the three basic options discussed below:

1. Single Planning and Management Agency

One option is to establish a single planning and management agency with a geographical jurisdiction the same as the 208 planning area. In some situations where a single governmental jurisdiction already exists, and whose jurisdiction encompasses the entire 208 area, it may be assigned both the planning and management responsibilities. This would facilitate closer coordination between planning and management than where these two responsibilities are assigned to separate agencies, and would achieve greater economies of scale. Where such an agency is based partly on a Council of Governments (COG) or regional planning agency which has been designated as a clearing house agency under A-95, final approval of specific projects in the 208 area can be expedited. Where A-95 authority is lacking, the new agency adds another level of decision making to the A-95 process. In the latter case adequate provision will have to be made to insure that elected officials are included on the agency board so as to meet the representation requirements of the Act.

2. Single Planning Agency and a Single Management Agency

Another option is to divide the planning and management responsibilities between two separate agencies. This would make day-to-day coordination more difficult but might facilitate approval of specific projects if the planning agency has A-95 authority. A previously established COG or regional planning agency could be utilized as the planning agency for 208. Since such organizations already have local elected officials on their boards, the representation requirements would automatically be met. This would also mean that the management agency would be under the direction of professional management as it carries out the day-to-day implementation of the areawide management plan. Where separate management agenicies are involved in waste treatment, consolidation of such agencies would have to be brought about entailing some loss of local authority. Economies of scale could also be attained as in Option 1 above.

3. Single Planning Agency and Plural Management Agencies

A third basic option would be to have a single planning agency and more than one management agency. This option would allow those management agencies already providing waste treatment service to continue doing so with a minimum effect upon their internal administration. Coordination between the planning agency and the management agencies is made more difficult but individual governmental jurisdiction could retain their own waste treatment agencies and other authority. This option, therefore, would permit the maintenance of existing institutions and agencies to a closer degree than the other basic options. Representation requirements of the Act could be met by the planning agency as in the other basic optional approaches. Economies of scale would not as likely be attained due to fragmentation. Nevertheless, where the option is favored, provision for effective coordination among the several jurisdictions and agencies must be made.

C. Intergovernmental Aspects

No matter which of the above options is chosen, intergovernmental relationships are of primary importance in both the establishment of the management system as well as in the implementation of the areawide plan.

1. Legal Basis for Establishing §208 Agencies

Adjustment in the authority exercised and in services performed by local, regional or State governments in a §208 area may be effected by different legal forms of agreement given statutory authorization.

a. Contract. Where a single agency already encompasses the entire §208 area, other participating local units of government may contract with it to provide the services required. A county, metropolitan government, or metropolitan special district are examples of such a unit.

b. Joint Exercise of Powers. Where they do not already exist, consolidated agencies may be established jointly by the participating local units of government.

Interlocal contracts or agreements may be utilized in such joint exercise of powers.

c. Transfer of Functions by the State. Where a new areawide agency is established, the State may transfer functions to it from other local, regional, or State agencies.

2. A-95 Review

In accordance with OMB (Office of Management and Budget) Circular A-95 Revised, dated November 13, 1973, all applicants under Federal programs providing assistance to State, local, and areawide projects and activities that are planned on a multijurisdictional basis, must notify the appropriate State and areawide planning and development clearinghouse for its review and comment. The regional clearing house reviews the proposed application as to its consistency with areawide plans including comprehensive planning, environmental concerns, water supply and distribution systems, sewage facilities and waste treatment works, and land use. In most cases, either a regional planning agency or COG serves as the regional clearinghouse agency, and as mentioned above, may be utilized also as the areawide planning agency under §208. As part of its review responsibilities, the State checks to see that any proposed application is consistent with basin planning under §303. On the national level, EPA reviews the annual certification of State plans.

CHAPTER 9

FINANCIAL ARRANGEMENTS

9.1 Introduction

Financial planning is an integral part of the 208 areawide planning process. The financial arrangements necessary for the areawide agency(s) to carry out the areawide plan must be included in the plan. The areawide plan should not include proposals which the implementing agency(s) cannot finance because of lack of legal capacity or actual capability. The purpose of this chapter is to identify the areas in which problems may arise in complying with the financial requirements of the Act. It does not set forth methods or procedures for financial arrangement for funding the costs of capital construction or for raising revenues or assessment of waste treatment charges. It is better left for the applicants to ascertain the methods of financing most suited for their particular problems and as authorized by their enabling legislation.

These problem areas are divided into three categories:

A. Capital construction costs

B. Operational costs (revenue)

C. Indirect (overhead) cost to be financed

With respect to each of these financing arrangements, pertinent provisions of the Act and specific problems are set forth below. Short term and long term budgeting and other financial activities are also discussed.

9.2 Requirements of the Act

Provisions directly and indirectly affecting financial arrangements are dispersed throughout the Act. Those specifically affecting 208 areawide waste treatment management are set forth in Title II. There should be an overall integrated approach to planning and budgeting the financial arrangements in order to comply with these various requirements.

A. Capital Construction Costs

1. §208(b)(2)(E) requires that the areawide management plan include identification of the measures necessary to carry out the plan including financing and the costs of carrying out the plan within the necessary period of time. This applies to all capital costs associated with point and nonpoint source controls.

2. §204(a)(4) requires that the applicant proposing to construct treatment works agrees to pay the non-Federal costs of such work.

3. §204(b)(1)(C) provides that the Administrator shall not approve any grant for any treatment works unless he shall first determine that the applicant has the financial capability to insure adequate construction, operation and maintenance of the treatment works throughout the applicant's jurisdiction.

4. §208(c)(2)(C) requires that the waste treatment management agency(s) have adequate authority directly or by contract to design and construct new works and operate and maintain them.

5. §208(c)(2)(D) requires a management agency have adequate authority to accept and utilize grants or other funds from any source for waste treatment management purposes.

6. §208(c)(2)(F) requires that the waste treatment management agency(s) have adequate authority to incur short and long term indebtedness.

7. §204(b)(1)(B) provides that the Administrator shall not approve any grant for any treatment works unless the applicant has made provision for industrial cost recovery (the recovery from industrial users of the treatment works of that portion of the cost of construction of such treatment works which is allocable to the treatment of such industrial waste to the extent attributable to the Federal share of the cost of construction).

8. Section 12 provides for an Environmental Financing Activity under the Secretary of the Treasury. This Authority is established to assure that inability to borrow necessary funds on reasonable terms does not prevent State or local public bodies from carrying out waste treatment works construction projects eligible for assistance under the Act. The Authority is authorized to purchase the obligation of these public bodies to finance the non-Federal share of such construction.

B. Operational Costs and Assessment of Revenue

1. §204(b)(1)(C) provides that the Administrator shall not approve any grant for any treatment works unless the applicant has financial capability to insure operation and maintenance of the treatment works.

2. §208(c)(2)(E) provides that the waste treatment management agency must have adequate authority to raise revenues, including the assessment of waste treatment charges, to implement all elements of the plan.

3. §208(c)(2)(G) provides that the waste treatment management agency must have adequate authority to assure, in implementation of an areawide waste treatment management plan, that each participating community pay its proportionate share of the treatment costs.

4. §204(b)(1)(A) provides that the Administrator shall not approve any grants for any treatment works unless the applicant has adopted a system of user charges assuring that each recipient of waste treatment services will pay its proportionate share of the cost of operation and maintenance (including replacement) of any waste treatment services provided by the applicant.

C. Indirect (Overhead) Costs to be Financed

1. §208(b)(3) requires that the areawide waste treatment management plan shall be certified annually by the Governor of the State or his designee as being consistent with the applicable basin plan. §208(f)(1) provides that the Administrator shall make grants to designated agencies for payment of the reasonable costs of developing and operating a continuing areawide waste treatment management planning process. From these two sections it is the intent of the Act that there will be an ongoing planning process within each area which must be financially supported.

2. §208(b)(2)(F)-(K) provide that the areawide management plan shall include processes to identify and/or control nonpoint sources of pollution.

3. §201(e) provides that the Administrator shall encourage waste treatment management which results in integrating facilities for sewage treatment and recycling. It further provides that such integrated facilities shall be designed and operated to produce revenues in excess of capital and operation and maintenance costs and that such revenues shall be used by the designated regional management agency to aid in financing other environmental improvement programs.

9.3 Specific Problem Areas

A. Capital Construction Costs

Due to the number and variety of methods for financing waste treatment management under State and local laws, each plan should include the broad range of financial arrangements available rather than following any rigid formula. Some requirements of the Act should present few if any difficulties with regard to financial arrangements. Other requirements are more likely to cause problems. Arrangements which should be relatively easy to provide are as follows:

1. Capital funds may be raised or generated from the general fund. This is particularly true if the applicant is a governmental unit of general jurisdiction.

2. Capital funds may be generated from grants or funds from any other source. In some instances, matching funds may be required.

3. The capacity and ability to contract indicates a limited ability to generate short term indebtedness.

4. The capacity to incur short term indebtedness may be demonstrated by the ability to issue bond anticipation notes, grant anticipation notes, or to borrow from State agencies. Such short term indebtedness must, of course, comply with constitutional limitations on such borrowing and with any State or local statutory requirements.

5. The capacity to incur long term debt may be demonstrated by the capacity to issue general obligation bonds, revenue bonds, or the capacity to borrow from State agencies. Exercise of this capacity to borrow is of course limited in many instances by constitutional or statutory provisions. There must also be compliance with State and local statutory requirements for the issuance of bonds or the incurring of such long term indebtedness.

Areas in which problems may be encountered in complying with the Act include the following:

1. The industrial cost recovery requirements of the Act are specifically covered in 35 CFR, Subpart E, of the grant regulations. Industrial cost recovery charges may be allocated on a systemwide basis provided that the treatment works project for which the grant is made is substantially interconnected with a goal to be completely interconnected physically with all other portions of the system. In order to avoid any problems of priority between bond holders and the industrial cost recovery share, the industrial cost recovery share must always be segregated and accounted for separately. In instances where industrial users must make long term binding commitments for repayment, provision can be made for transferability of this commitment in order to promote industrial growth and change within the area. It is implied that a long term commitment to repay is in exchange for provision of

services to treat the user's industrial wastes. Both the commitment and the right to services should be transferable, subject, however, to approval by the waste treatment management agency.

2. In the event of consolidation of two or more areas or agencies each of which previously had supplied waste treatment services and had incurred indebtedness and other contractual obligations to provide such services, the problem of the consolidated agency assuming the indebtedness and contractual obligations must be identified and a legally acceptable method of overcoming this problem must be set forth. Particular attention must be paid to such contractual obligations as personnel contracts, retirement benefits, long term supply contracts, etc.

3. In the event of consolidation, problems may arise with respect to the new waste treatment management agency reimbursing the participating agencies for the value of their existing facilities and assets. A fair and uniform method of arriving at the values of these assets and a legally acceptable method of handling the transfer should be set forth.

B. Operational Costs and Revenue Assessments

1. User charges. 40 CFR, Subpart E, and related guidelines provide the basis for establishing user charges. As set forth in these regulations and guidelines, the Act requires that each recipient of waste treatment services pay its proportionate share of costs of operation and maintenance. Charges based on property values only will not suffice in most instances to satisfy this requirement of the Act. An exception to this is the situation in which such charges have been used historically, the change-over would be costly and disruptive, and the goal of proportionality among user classes can be achieved by such systems. Uniform rates on volume among classes of users will suffice provided that the classification reflect the differences in cost of treatment among classes of users.

2. Participating communities' proportionate shares. In determining each participating community's proportionate share of treatment costs, the differentials among communities should be explained and justified. In the event that all participating communities are charged on the same basis, the reasons and justification for doing so should be explained. The provisions and effects of interlocal agreements and contracts to supply waste treatment services should be reviewed and set forth. The methods of charging users within each of the participating communities should be defined. The user charge requirement cannot be avoided by interlocal agreements or contracts to supply waste treatment services. User charge requirements must be reflected in determining the participating communities' proportionate shares of treatment costs.

C. Indirect (Overhead) Cost to be Financed

1. Ongoing planning is a function for which provision must be made in budgeting. The amount and the source of such funds should be set forth. Items of the ongoing planning process which should be budgeted include, among others, discharge source inventory, monitoring, surveillance, and performance evaluation to the extent needed to supplement the State sponsored efforts on these items.

2. The ongoing planning process also requires public participation. In order to participate, the public must be informed. Participation of the public and information dissemination to the public are important matters, and the cost to provide the information and encourage public participation should be budgeted.

3. To the extent that the areawide waste treatment management agency is involved in the ongoing identification and control of nonpoint sources of pollution, the cost should be budgeted and the source of income indicated. If performed by State level agencies, this should be noted.

4. To the extent that the waste treatment management agencies are involved in the permit system, the expense in excess of that collected for permit fees should be budgeted and the source of income provided.

9.4 Other Financial Activities

A. The plan should indicate a 20-year projection of financial arrangements to provide the treatment works necessary to meet the anticipated municipal and industrial waste treatment needs of the area over the 20-year period.

B. A more detailed 5-year projection including capital improvement budgeting and cash flow should be provided. It should include start-up costs, carrying charges during the first years of operation and similar nonrecurring costs associated with the implementation of a new treatment works or waste treatment management system.

C. The legal capacity of the agency(s) to perform as planned should be set forth in an opinion letter of legal counsel for the Agency. In the case of financial arrangements, opinions of special counsel experts in the field of bond financing is acceptable.

D. The financial capability of the Agency to perform as planned should be set forth in the report of the independent auditor for such Agency. As an example, the extent to which the Agency has unused bonding capability should be identified if general obligation bonds are to be used as a method of financing.

E. Where legislative or electoral approval of financial arrangements are required, the method of obtaining such approvals should be identified.

F. Financial arrangements (fiscal/economic) may be used to influence behavior (amount and type of discharge). The use of such arrangements is discussed in Chapter 7.

CHAPTER 10

DIRECT RESOURCE COSTS

10.1 Introduction

The Act requires that areawide plans consider alternative methods for waste management, that the cost of carrying out alternatives be identified, as well as their economic, social and environmental impacts, and, generally, that the choice of alternative be "cost efficient" or "cost effective"--that is, water quality goals should be met at minimum cost.

As cited in Chapter 1. , cost-effectiveness analysis is defined as an analysis featuring systematic comparison of alternatives to identify the solution which will minimize total costs to society over time to reliably meet given goals or objectives. Total costs to society include resource costs plus social and environmental costs. The analysis involves identification and study of the tradeoffs among resource costs, environmental effects and other aspects of the alternatives, leading to selection of the best plan.

Resource cost (discussed in this chapter) refers to the values of goods and services representing primary project inputs, including capital cost as well as operations, maintenance and replacement cost. Resource cost may be more or less readily measured in monetary terms; environmental and social effects, discussed in the next chapter, are more difficult to put into monetary terms, and must be described and evaluated in a more judgemental way.

10.2 Basic concepts in identifying resource costs

A. Economic cost

In considering the cost of implementing a plan, it is necessary to distinguish between outlays and economic costs. In many instances cash outlays adequately represent cost, but sometimes a resource is used for which no cash outlay is made. The cost in such a case is the value that the resource would have in its best alternative use--its "opportunity cost." For example, acquiring public land for a treatment plant may involve no cash outlay, but may have an opportunity cost in terms of foregone recreation or commercial use. If such opportunity costs are not considered, plan selection will be biased toward those options which do not require outlays, though in fact they involve other costs.

Moreover, the definition of cost as opportunity cost implies that the cost to the community and nation as a whole are considered, not merely the cost to one party or another, in evaluating alternative plans.

B. Price levels

Where costs are estimated for future periods, they should be stated in terms of base period dollars; future costs should not reflect any expected overall increase in wages and prices.

Exceptions to the foregoing should be made if there is justification for expecting significant changes in relative prices during the planning period. For example, at the present time, there are energy shortages, and the long-term prospect is for higher energy costs. Even though it is practically impossible to predict how much energy costs will rise, it is essential that the choice of alternatives be tested for the effect of higher energy costs.

C. Interest rates

Discounting is essentially a way to take account of the fact that the investment of funds in a project has an opportunity cost, in the sense that the funds could also have been used productively in the private sector of the economy or in some other public project. The applicable discount rate determines the optimal choice between capital expenditures now versus higher operating costs in the future, the optimal amount of reserve capacity to build, and so on.

In discounting, the costs of a plan are stated in terms of their present values. That is, future costs are discounted at an applicable rate of interest back to some initial starting date, and added to the initial capital costs. Alternatively, the present values may be converted into equivalent annualized values. Standard procedures are described in engineering economics and business finance texts.

The interest rate to be used in evaluating water-related public projects is prescribed by the Water Resources Council, a Federal inter-departmental group, in its "Principles and Standards for Planning Water and Related Land Resources", as amended by PL 93-251 (1974). The rate specified by the Council is based on the interest rate on Federal Securities with maturities of 15 years or more; the rate to be used for the coming fiscal year is determined by the Council on July 1. For fiscal year 1974, the rate is 5 5/8%. Because it is recognized that such a rate is low in terms of opportunity costs in the private sector, a rate of 7% is suggested for evaluation purposes in a 208 plan.

10.3 Specific cost questions

A. Sunk costs and salvage values

These terms refer to capital assets in existence at the beginning or end of a program.

For simplicity, investments and cost commitments made prior to or concurrent with the planning study are regarded as sunk costs and not included as a cost for plan evaluation and comparison. Such investments and cost commitments include, for example: (1) investments in existing wastewater treatment facilities and associated lands to be incorporated into a plan; (2) outstanding bond indebtedness. However, if inherited assets were to be disposed of in one alternative--say a small treatment plant were to be scrapped and the land sold--their sale value would be treated as a credit to that plan.

Salvage value. Normally, land for treatment works, including land used as part of the treatment process or for ultimate disposal of residues, should be assumed to have a salvage value at the end of the planning period equal to its prevailing market value at the time of the analysis less any costs required to restore the lands to pre-project conditions. Salvage value of land reclaimed by land treatment or sludge disposal should be estimated as the value of the reclaimed land. Rights-of-way and easements should be considered to have a salvage value not greater than the prevailing market value at the time of the analysis.

Permanent structures should be assumed to have a salvage value at the end of the planning period if those structures can be expected to continue to fulfill their planned use. Where a structure can be expected to continue to be used as planned, salvage value should be based on the remaining functional life of the structure based on a straight line depreciation over the assumed functional life of the structure. The same approach for determining salvage value applies to process and auxillary equipment that will have useable value at the end of the planning period.

B. Capital and operating costs

Elements of total cost include capital construction cost, annual operation and maintenance costs and equipment replacement costs.

As set out in EPA cost-effectiveness guidelines (40 CFR 35), capital costs for facilities include: cost of land, relocation and right-of-way and easement acquisition; design engineering, field exploration and engineering services during construction; contractors' costs of construction including overhead and profit; administrative and legal services including cost of bond sales; and startup costs such as operator training. Contingency allowances consistent with the level of complexity and detail of the cost estimate are also included.

The capital costs of a plan would include those incurred by public agencies, as well as those incurred by private parties. These two categories of cost are carried forward to the summary table shown in Chapter 13. For the private costs, treatment facilities built by industrial companies for direct discharges or for pretreatment would be included.

Where waste and flow reduction measures are carried out by a large number of industrial and household dischargers, in response to user charges, it is difficult to estimate the private costs. Unless the costs have a bearing on the choice of a cost-effective plan, such estimates are unnecessary.

Annual operating and maintenance costs for each alternate plan must be established. These costs should be adequate to ensure effective and dependable operation and include all costs for operating and maintaining the facilities under study including power, labor, parts, materials, overhead, chemicals and repair or replacement of equipment and structures.

Cost-effectiveness analyses require establishing a service life for each component and salvage values for components having service lives longer than the planning period. The following service lives are to be used, unless other periods can be justified:

Land	Permanent
Structures	30-50 years
Process Equipment	15-30 years
Auxiliary Equipment	10-15 years

C. Administrative Costs

Areawide waste planning and management is likely to include a number of ongoing costs not always associated with facilities management, for activities such as monitoring of streams, monitoring the waste characteristics of major industrial dischargers, periodic checks of infiltration and inflow, records of storm and runoff characteristics, collecting and analyzing data on residential water use, etc. These functions are as important to the effectiveness of a plan as the physical units in place. The costs may not vary significantly in alternative plans, but should be included in financial projections. Whether such costs can be recovered by direct charges -- e.g. permit fees, monitoring fees, etc. -- should be considered and evaluated.

D. Accuracy of cost estimates

The accuracy of cost estimates for all point and nonpoint elements of 208 plans should be sufficient to assure the reliable selection of the cost-effective solution, in a comparison of alternatives. Gross cost estimates ordinarily suffice for preliminary screening. Comparison of those plans selected for detailed evaluations should be based on information such as the following:

> Unit process costs associated with the different wastewater and sludge treatment processes considered. The unit costs should be applicable to the locality or region.
>
> Preliminary engineering layouts, quantity estimates, and unit costs for the sewer lines and appurtenant works. Such unit costs should be representative of the area, based on recent comparable projects.
>
> Market value of land or easements required for facilities.

The above detail of cost estimates should be refined sufficiently to provide a basis for the 5-year financial budget stipulated in Chapter 9. Such estimates might be based upon preliminary engineering layouts and designs, taking account of facilities in place. Should the more refined estimates of the selected system differ considerably from the previous estimates, the prior comparative evaluations of alternatives should be revised to assure the selection of the most cost-effective system. Since, in Chapter 9, financial budgets are stipulated to cover the first five years, the level of detail for costs will ordinarily be greater for that period.

E. Present values

Using the interest rate of 7 percent suggested in 10.2.C, the costs for construction and operations, by year, should be discounted to the proposed plan initiation date, to obtain the present value (or, what is much the same thing, the annualized value) of the plan alternatives. An example is given in EPA Guidance for Facilities Planning, January 1974, Appendix to Chapter 4.

CHAPTER 11

ENVIRONMENTAL, SOCIAL AND ECONOMIC IMPACT EVALUATION

11.1 Purpose

The purpose of this chapter is to provide guidance for integrating the environmental, social and economic impact evaluation into the 208 planning process. It is also intended to meet, in part, the requirements of Sec. 102(2)(c) of the National Environmental Policy Act of 1969. Thus, this evaluation will provide the necessary information to support the applicant's integral environmental assessment. The information will also be used to support the preparation of an Environmental Impact Statement if it is required.

The evaluation must be viewed as an integral part of the planning process. As such, it will be performed during the entirety of the planning process rather than after the selection of the 208 plan. Citizens and local units of government should be provided the opportunity to participate from the beginning in this evaluation process. As a result, affected citizens and units of government will be better able to analyze the various alternatives and thus aid in the identification of specific plan impacts, and provide meaningful views for consideration in the selection of the areawide plan.

11.2 Environmental, Social and Economic Impact Evaluation Process

A. Inventory Existing Conditions

The purpose of inventorying existing conditions is twofold: (1) it will aid in goal and problem identification; and (2) it will serve as a basis for the analysis and comparison of alternatives. The inventory will undoubtedly require additions as new problem areas are identified in the planning process. At a minimum, the inventory will encompass the 208 planning area together with pertinent areas outside of the planning area that would be affected by the plan. For example, land disposal sites for effluent or sludge, other wastewater reuse sites and the downstream river corridor that would be affected through effective water quality management would be considered.

The data should complement rather than duplicate information presented elsewhere in conjunction with this planning. Only that data which is relevant to the analyses of alternatives or determination of impacts should be included. Thus, the inventory may include but not necessarily be limited to the following:

1. Climate and precipitation;
2. Topography;
3. Geology;
4. Soils including erodability;
5. Hydrology (surface and groundwater):
    a. water quality
    b. water quantity
    c. water uses
    d. flood hazards;
6. Biology:
    a. rare and endangered species
    b. wildlife habitats;
7. Air quality;
8. Land uses:
    a. amount of growth
    b. type of growth
    c. intensity of growth (The growth data should be of recent origin. There is no necessity to examine growth trends further back than 1960).
    d. significant environmentally sensitive areas;
9. Wastewater management resources including energy;
10. Economic activity (gross assessment):
    a. income per capita
    b. agriculture
    c. mining
    d. manufacturing
    e. service;
11. Employment trends including regional availability of skilled manpower for treatment plant operation and monitoring.
12. Public Health; and

13. Aesthetics:

    a. recreational accessibility and activities
    b. unique archeological, historical, scientific and cultural areas
    c. noise pollution.

The inventory should also include identification of adopted goals and pertinent constraints. Such goals might typically include:

1. Preservation of high quality surface water;
2. Preservation of coastal or other wetlands;
3. Preservation or enhancement of fish and wildlife;
4. Enhancement of municipal services.

Examples of constraints include:

1. Air quality regulation and implementation plans;
2. Local climate, topography, soils, etc; and
3. Restrictions on flood plain use or other land uses;

In most cases the data needed for the inventory should be readily available in existing documents. Thus, primary data collection should be minimal.

B. Evaluation of the Existing Situation

Based upon the inventory of existing conditions a brief analysis of the existing situation should be conducted. The intent of this evaluation is to prioritize pollution problems and sensitive impact areas. This prioritization will be a primary concern during the remainder of the evaluation. Public participation (including government agencies) will be needed to help with problem and impact prioritization.

C. Develop Baseline Projection

The inventory and evaluation of the existing situation will serve as inputs into the development of a baseline projection. It will be necessary to construct a baseline projection of relevant environmental, social, and economic factors so that each of the alternatives can be evaluated. These factors or indicators are presented in Table 13.1 (Chapter 13). The baseline projection can be established by extrapolating present indicator trends assuming that no additional water quality actions will be taken other than those that have already been approved. Alternatively, the 208 plan alternative that deviates the least from the status quo can serve as the baseline.

D. Evaluate Alternatives

After the alternatives have been developed, each of them should be evaluated by comparing their impacts to the baseline projection. Special consideration should be given to those sensitive impact areas identified in tha evaluation of the existing situation.

It is not necessary to do a complete environmental assessment of each of the alternatives. In every case, however, the impacts of both the structural and nonstructural aspects of the plan should be considered. Table 13.1 contains a list of those environmental, social and economic factors believed to be generally most important. Special attention should be given to long-term impacts, irreversible impacts, and indirect impacts such as development. Resource and energy use associated with each alternative should also be highlighted. The results should be displayed in a format for use in public meetings and other participation efforts.

11.3 Environmental Effects of the Selected Plan

The results of the environmental, social, and economic impact evaluation will be used in the plan selection process (Chapter 13). Once a plan has been adopted, a complete description of the impacts that the selected plan will have on the area's environment should be completed. The vast majority of the data required to do this should be readily available as a result of the evaluations already performed. This more detailed evaluation should describe the impacts of the proposed structural and nonstructural actions. Whenever possible, the impact of each action on each affected environmental, social or economic category (see Table 13.1) should be described and displayed. However, if more than one action impacts a category, the cumulative impact should be described. Impacts may be categorized as:

1. Beneficial or adverse;

2. Short or long-run;

3. Reversible or irreversible; and

4. Primary (direct) or secondary (induced).

Included in the irreversible impacts should be an evaluation of any irreversible commitments of resources including energy. (See §6.304 (c-f) of 40 CFR Chapter I, Part 6 for an explanation of these terms and examples).

Emphasis should be given to the cumulative impacts of all elements of the plan. In addition, more localized impacts of specific plan elements, such as treatment plant locations, interceptor sewers, and industrial site locations, should also be assessed and highlighted when these impacts are judged as significant. Greater emphasis should be given to those localized impacts of individual projects anticipated to be developed during the initial five years of plan implementation.

CHAPTER 12

PUBLIC PARTICIPATION

12.1 Introduction

A. Need for Public Involvement

An effective public involvement program is essential to ensuring the success of any areawide water quality management effort. In addition to the legal requirements there are sound reasons for undertaking such efforts. Public participation provides an opportunity for resolution of conflict, an opportunity for the presentation of contrasting points of view, and the transmittal of important information. If a planning agency has made adequate provisions for public involvement the final plan should accurately reflect community goals and preferences. Such involvement would also reinforce public trust in the planning process, thereby increasing the likelihood of public acceptance of the final plan and achievement of water quality goals.

B. Legal Requirements

Public participation is an important element in any water resources planning effort. The authors of the Federal Water Pollution Control Act Amendments (P.L. 92-500) recognized this fact and set forth certain minimum requirements for public involvement. Section 101(e) states:

> Public participation in the development, revision, and enforcement of any regulation, standard, effluent limitation, plan, or program established by the Administrator (of EPA) or any State under this Act shall be provided for, encourage, and assisted by the Administrator and the States.

In accordance with certain requirements established in the Act the Environmental Protection Agency has published regulations specifying minimum guidelines for public participation in water pollution control efforts. These regulations (40 CFR 105) require State agencies to do the following:

1. Develop a program that will provide informational materials for public use at the earliest possible time.

2. Make sure that such information--which is to include water quality data and other pertinent information--is conveniently accessible to the public at informational "depositories" in appropriate locations.

3. Provide technical and information assistance "to public groups for citizen education, community workshops, training, and dissemination of information to communities."

4. Develop mechanisms that will allow interested or affected individuals and organizations to have early consultation with the agencies on program matters.

5. Develop and maintain lists of individuals who wish to receive information from the agency on a regular basis.

6. Follow EPA regulations concerning procedures for the holding of public hearings if the State agency's procedures are less stringent.

7. Conduct public hearings whenever there is significant public interest.

8. Whenever there is doubt concerning the degree of public interest, the question should be resolved in favor of holding the hearing or, if necessary, of providing alternative opportunity for public participation.

9. Give the public at least 30 days notice prior to hearings and prepare detailed fact sheets on the issues involved.

10. Provide an opportunity for public comment before any settlement with a pollution source is negotiated.

11. Encourage the public to report violations of water quality laws.

12. Develop procedures for the consideration of evidence submitted by the public.

13. Include a summary of public participation in any application for a construction project grant. Each summary must include a description of the measures taken by the agency to provide for, encourage and assist public participation in relation to the matter; the public response to such measures; and the disposition of significant points raised.

It must be stressed that the actions covered in these regulations represent only the minimum steps that local agencies may undertake in the area of public involvement. The success of any 208 planning effort will probably depend in large part on the degree of public involvement that the local planning agency is able to achieve.

C. Goals and Objectives of Public Involvement Programs

Beyond satisfaction of the legal requirements for public participation there are several sound objectives that any agency involved in a 208 planning effort should try to achieve:

1. At the very beginning of any planning effort the Agency involved should seek to identify affected public interests and maintain their involvement throughout the planning process.

2. An informed public. It is of primary importance to provide the public with an opportunity to thoroughly familiarize themselves with all the various aspects of the planning effort so that they can contribute in a meaningful way to intelligent decisions.

3. Citizens should be provided with an opportunity to:

    a. Help in defining the community/s goals and problems.

    b. Assist in delineating types of solutions.

    c. Formulate several alternative solutions for wastewater management consistent with the views of the public.

    d. Assist in defining the impact assessment of each alternative and react to the solutions.

    e. Facilitate the identification of public preferences from these various alternatives.

Achievement of these objectives does not guarantee an increased probability of actual plan implementation, but it will help to ensure that whatever plan is finally selected reflects the preferences of those most affected.

12.2 Considerations for Development of a Public Involvement Program

A detailed public involvement program should be assembled as soon as possible after area designation. The plan should detail the specific mechanisms to be used at each step in the planning process. It is important that the process be structured so that it depends absolutely upon receiving public inputs at each specific stage. Once developed, programs must be continually evaluated and adjusted in response to changing requirements.

In devising a public involvement plan, the responsible agency should consider the requirement that the 208 plan be completed within two years after grant approval. Since on-going public participation is potentially a lengthy and time-consuming process, planners should maintain a realistic balance between the need for public involvement and the need to complete the planning process within the allotted time.

12.3 Timing of Key Public Involvement Issues

A. Initial Stage

During the first stage of a 208 project the planning agency will identify the participants and their responsibilities, establish channels of communication between the participants and convince potential participants that their inputs are needed. Other inputs to be obtained at this stage include:

1. an evaluation of public awareness of water quality problems;
2. an assessment of the relative importance of water quality goals in relation to other community goals;
3. an evaluation of community attitudes toward growth and the role that water quality management can play in achieving community growth objectives;
4. an assessment of public attitudes about the use of land use controls in regulating water quality;
5. a determination of the public's willingness to participate in regional plans that might result in some loss of local autonomy and control.
6. An estimate of public attitudes toward land disposal and other innovative and controversial pollution control technologies.

B. Design of Alternatives

Inputs from the initial stage will be used to establish design criteria for the development of plan alternatives. As this is done, other essential inputs include:

1. an assessment of the acceptability of certain economic, social and environmental impacts, such as new uses for water permitted by improving its quality, disruptions due to the construction

of facilities, new demands on water supply and potential for stimulating community growth.

2. an evaluation of community attitudes toward institutional and financial alternatives that might be adopted to implement the plan.

C. Impact Assessment

Public response to preliminary impact assessment of the various alternatives is required. The public will now have the opportunity to suggest the study of impacts that were not addressed or to urge more detailed study of those that were considered. Special efforts should be made to obtain the reactions of those individuals and institutions that would bear the responsibility for financing, construction, operations, monitoring and enforcement.

D. Recommendation and Acceptance of the Final Plan

During this stage the planning agency will consider any reasons why the least-cost plan should not be chosen, such as the attainment of additional benefits from increased expenditures, or the minimization of undesirable social, economic and environmental impacts. Public comment is needed to conduct an analysis that accurately reflects community goals and preferences.

At this stage it is vital that elected officials who are responsible for local approval of the recommended plan are made aware of public comments and opinions. This is a major responsibility of the entire public participation program.

E. Implementation

Once an areawide plan has been selected the need for public involvement will be greatly reduced; however, it must still continue. The public should then be assisted and encouraged to participate in planning for individual waste treatment works that is undertaken as the 208 plan is implemented. (See 39 FR 29, "Construction Grants for Waste Treatment Works," February 11, 1974.) The public should also have the opportunity to participate in any periodic updating of the 208 plan. Information must be available on a continuous basis to permit adequate monitoring of progress made under the plan.

12.4 Public Participation Program Development

A thorough plan for public involvement should be assembled as soon after designation as possible. The plan should detail the specific mechanisms that are to be employed at each step in the 208 planning process. While there are no hard and fast rules for structuring a public involvement program several steps appear to be essential. The following tables suggest the way in which integration of the planning process and public involvement mechanisms may be achieved.

SUGGESTED PUBLIC INVOLVEMENT Mechanisms for Sec. 208 Planning Sequence	One-Way Output								One-Way Input			Two-Way Interaction								
	Depositories	Exhibits	Mailings	Newsletters	News Media	Speeches	Publications	Seminars	Info. Solicitations	Public Hearings	Surveys	Advisory Groups	Correspondences	Informal Contacts	Interviews	Liaison w/ groups	List Developments	Public meetings	Workshops	Task Forces
DESIGNATION		✓	*		*		*						✓	✓		✓	*	*	✓	
TECHNICAL PLANNING																				
(a.) Assemble existing water quality data.	*											✓								
(b.) Construct inventory of existing dischargers.	*			✓			*		✓			✓								
(c.) Projections (Includes Land Use Plan)	*	*	✓	✓	*		*		✓	*	*	✓		✓	✓	✓		*		
(d.) Effluent Limited Segment Analysis	*		✓	✓			*		✓	*	✓		✓			✓			✓	
(e.) Water quality segment analysis	*			✓			*	✓				✓								✓
(f.) Determine alternate subplans of treatment control flow reduction consistant with elegible WLA (including information on cost) effectiveness, reliability, and environmental impact.	*		✓	✓			✓	✓	✓	*	✓	*		✓		✓	ON GOING	✓		
(g.) Screen subplans to select leading alternative subplans	*	✓	✓	✓	✓	✓	*			✓		✓		✓	✓	✓		*		
MANAGEMENT PLANNING																				
a.) Definition of objective	✓		✓					✓												
b.) Background inventory	✓		✓						✓			✓		✓				✓	✓	
c.) Conduct management analysis	*		✓	✓					*			*		✓		✓		✓		
d.) Develop and screen alternative management plans.	*		*	*			*	✓	*	*		*		✓	✓		↓	*	✓	✓

Remarks

* Denotes Essential or Required Steps

✓ Denotes Suggested Mechanisms That May Be Utilized In Addition To the Required Steps

SUGGESTED PUBLIC INVOLVEMENT

Mechanics for Section 208 Planning

	One -Way Output								Two-Way Input			One-Way Interaction								
208 PLANNING STEPS	Depositories	Exhibits	Mailings	Newsletters	News Media	Publications	Speeches	Seminars	Info. Solitions	Public Hearings	Surveys	Advisory Groups	Correspondences	Informal Contacts	Interviews	Liason w/ groups	List Development	Public Meetings	Workshops	Task Forces
(a.) Evaluation and selection of combined technical and manpower plans	*	✓	✓	✓		*		✓	✓			✓		*	✓	*	ON GOING	*	✓	✓
(b.) Evaluate alternative area-wide plans:																				
1. Cost effectiveness		✓		✓	✓		✓			*	*					✓		✓		✓
2. Social environmental impact.		✓		✓	✓		✓			*	*					✓		✓		✓
TECHNICAL-MANAGEMENT PLANNING																				
(c.) Select areawide plan to implement:																				
1. Technical feasible			✓	✓	*	*	*			*				✓		✓		*		✓
2. Management feasible			✓	✓	*	*	*			*				✓		✓		*		✓
3. Public acceptance			✓	✓	*	*	*			*				✓		✓		*		
(d.) Develop detail for plan output and revise.	*			✓		✓						✓		✓						
(e.) Outputs	✓			✓		✓								✓						
(f.) Reports	*			✓	✓	*														

Remarks

* Denotes Essential or Required Steps

✓ Denotes Suggested Mechanisms That May Be Utilized In Addition To the Required Steps

12.5 Program Evaluation

An important part of any public involvement program is a set of feedback mechanisms to continually monitor the success or failure of the involvement mechanism being used. If the feedback indicates that ongoing efforts are inadequate, adjustments should be made as soon as possible so that the success of the program will not be jeopardized. In making an evaluation, information may be drawn from a variety of sources, including:

1. number and tone of informal contacts initiated by the public;
2. attendance at meetings and hearings;
3. amount of related public-sponsored activity such as meetings, workshops, door-to-door campaigns, etc.
4. amount and tone of media coverage; and
5. formal surveys

12.6 Advisory Committee

In compliance with Section 304(j) of P.L. 92-500 the Administrator of the Environmental Protection Agency has entered into an agreement with the Secretaries of the Departments of Agriculture, Army, and Interior. Notice of Final Agreements was published in the Federal Register, Vol. 38, No. 225, November 23, 1973.

As a result of this agreement the planning agency in each area designated under Section 208(a)(2) must provide for the creation of an advisory committee and invite representatives of the Departments of Agriculture, Interior, and Army to participate. Each Department may or may not participate as it deems appropriate. The purpose of this requirement is to provide for maximum utilization of the appropriate programs authorized under other Federal laws to be carried out for achievement and maintenance of water quality through appropriate implementation of plans approved under Section 208.

Pursuant to 208(2)(A) grant regulations for Section 208 (40 CFR 35 , Subpart F) further state that provisions must be made for inclusion of representatives of the State and public on an Areawide Planning Advisory Committee. The membership may be further expanded as may be appropriate in the opinion of EPA, the State(s) and the applicant agency.

12.7 Institutional Alternatives For Representation of the General Public

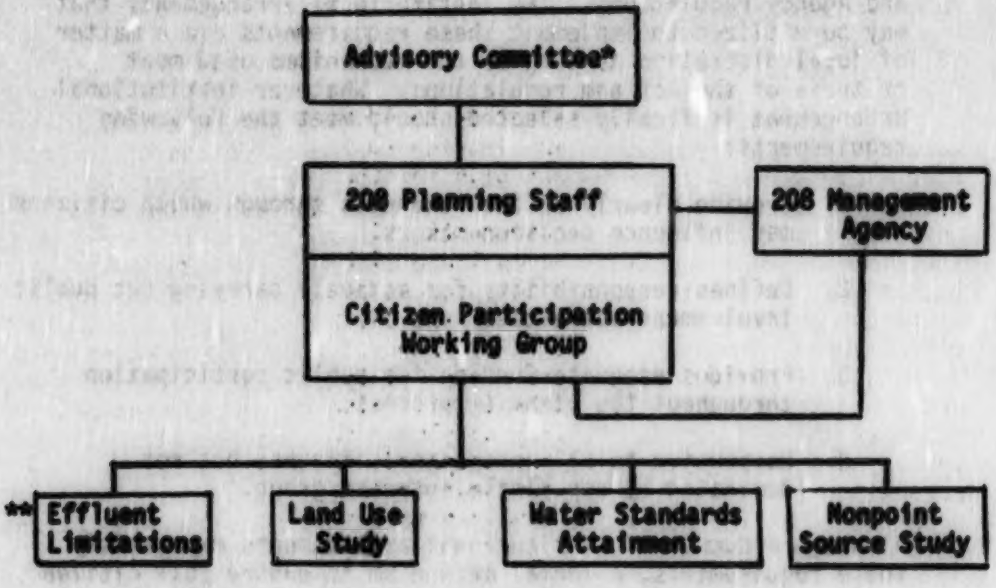
The requirement for public involvement in areawide water quality planning and management is clearly defined by the Act and Agency regulations. The institutional arrangements that may be utilized to implement these requirements are a matter of local discretion as long as the mechanisms used meet criteria of the Act and regulations. Whatever institutional arrangement is finally selected should meet the following requirements:

1. Provide clearly defined channels through which citizens may influence decision-makers.
2. Defines responsibility for actively carrying out public involvement activities.
3. Provides adequate funding for public participation throughout the planning process.
4. Responsive to all interested citizens, but not dominated by any single interest group.

Although a number of institutional arrangements may satisfy these requirements, a formal mechanism to ensure full citizen understanding and approval of the selected plan will probably be necessary given the scope and complexity of areawide water quality management.

One exemplary arrangement would feature a fully funded public participation working group acting in partnership with the 208 planning staff and management agency. At least two full time staff members would be needed to carry out the tasks of the working group. Additional funds should be made available to cover the cost of printing, announcements in the media and other incidental expenses. An illustration of this type of arrangement is provided on the following page.

ORGANIZATIONAL STRUCTURE


Advisory Committee*
208 Planning Staff
208 Management Agency
Citizen Participation Working Group
**Effluent Limitations
Land Use Study
Water Standards Attainment
Nonpoint Source Study

*Composed of non-voting Federal representatives (in compliance with the 204(j) agreement), State and local representation and a voting member of the Citizens Participation Working Group.

**The Working Group may wish to divide itself along the lines of major areas of concern as illustrated.

CHAPTER 13

COMPARISON OF ALTERNATIVES AND SELECTION OF PLAN

13.1 Purpose

The purpose of this chapter is to provide guidance in the comparison of alternative plans leading to the selection of an areawide waste treatment management plan for the area. The process presented assumes that each of the alternatives, if implemented, would meet all regulatory requirements. In addition, it is assumed that the alternatives are in compliance with appropriate goals and objectives. The intention of the process presented in this chapter is to compare the plans in terms of the defined criteria of cost effectiveness (monetary costs, environmental, social and economic impacts), technical reliability, feasibility of plan implementation, and public acceptability. Emphasis will also be placed upon drawing together the evaluations already completed so that the alternatives can be more easily discussed and compared. Finally, while public participation is necessary throughout the planning process, it is essential that the public be involved to a significant degree during this process.

13.2 The Plan Selection Process

A. Assessment of Alternative Areawide Plans

No rigorous analytical method exists which will readily identify the best plan for the area. As discussed in previous chapters, many factors should be considered in comparing the alternatives. Some of the factors, in particular cost assessments, can be quantified. Others cannot be easily quantified but can only be qualitatively assessed based upon professional judgement aided by the cumulative views of the public. Plan assessment involves the comparison of all key factors deemed pertinent for reliable decision making. Table 13.1 contains a list of those which are believed to be generally most important. The inputs for that table are to be developed in the technical planning process (Chapter 3.5.B), the step at which alternative plans are evaluated in light of information on their cost, technical reliability, environmental, social and economic impact, and implementation feasibility and reliability. The effects of the alternatives should be assessed quantitatively whenever possible. In all other cases a qualitative assessment should be made.

Representatives from all affected groups should be involved in the assessment of the alternative proposals. The definition of affected groups may be as broad or specific as desired. However, it should match the level of specificity that is chosen to analyze impact so that meaningful dialogues can be established. In most areas, affected groups would include conservation groups, economic interests, local elected officials, planning agencies, state departments of health, water pollution control and natural resources, the regional office of EPA and the Areawide Planning Advisory Committee. The efficiency of the plan approval and implementation process will be much improved if the people who are responsible for carrying it out fully understand and contribute to the assessment and recommendation of alternatives.

B. Develop Recommended Plan

Once the alternative plans have been assessed, the planning agency should be in a good position to compare the alternatives and, as a result of the comparison, develop a recommended plan. A logical approach for comparing the alternatives would be to initially identify that alternative which will achieve water quality objectives at minimum monetary cost. This least cost plan can serve as a base against which the increased costs and additional effects of other alternatives can be compared for the purpose of selecting the best plan for the area. The major environmental, social and economic impacts of this least cost plan should be listed, including a discussion of the institutional and financial issues that would be raised if the plan were recommended. One suggested format is shown in Table 13.2. Most of the required impact information should be contained in Table 13.1.

The next step should be the identification of the incremental monetary cost and incremental impacts of each of the remaining alternative plans in relation to the base plan. Information contained in Table 13.1 would provide the basis for this incremental evaluation. Description of alternatives should include the plan elements (such as construction, zoning, operations, etc.) and measures or statements of the changes in the impacts of those plan elements. In addition to the environmental, social, economic, and management impacts, additional benefits that could be gained or undesirable situations that could be avoided should be described. The alternatives should be described to make comparisons with the additional costs required as direct as possible. The results may be summarized in the format of Table 13.3.

The planning agency should then conduct workshops for the appropriate elected officials who will be reviewing and commenting on the proposed plan. The objective of the workshops should be to fully inform them of the consequences of implementing any of the alternative areawide plans. The agency should also take note of their responses to the alternatives to see if they can be changed to improve plan acceptability. Since these workshops and the public hearings to follow could very well result in requirements for substantial changes in the design of plan elements and the analysis of additional impacts, the agency should schedule resource expenditures to be able to respond fully to the need for additional analysis.

At the conclusion of the workshops, the planning agency should recommend a single plan as the proposed 208 plan. The plan elements, costs, impacts, and implementation issues can be summarized in the format shown in Table 13.2. The plan description should be accompanied by a brief report that summarizes the process followed, the alternatives considered and the criteria used to reach a final recommendation. The report and charts should be suitable for use at public hearings.

C. Hold Public Hearings to Present Proposed Plan

The planning agency should conduct formal public hearings on the proposed plan and the alternatives considered in its development. The planning agency should then respond to the issues raised at the hearings and modify the proposed plan if appropriate (as judged by the agency). The planning agency will then submit the proposed plan to the appropriate local governing bodies for review and recommendations as specified in Chapter 15 (15.2).

TABLE 13.1

COSTS AND EFFECTS OF ALTERNATIVE AREAWIDE PLANS

	Alternative Plans		
Significant Effects	**P-1**	**P-2**	**P-3**
1. Water Quality Goals			
A. Contribution to goals and policies of the Act.			
B. Contributions to other water-related goals of the planning area.			
2. Technical Reliability			
A. Frequency of plant upsets			
B. Frequency of spills			
C. Frequency and effects of combined sewer overflows			
D. Nonpoint source control			
3. Monetary Costs			
A. Capital costs including discounted deferred costs			
(1) public			
(2) private			
(3) total			
B. O.M. & R Costs			
(1) public			
(2) private			
(3) total			
C. Net revenue (public)			
D. Overhead and plan management			
E. Total average annual costs			
(1) public			
(2) private			
(3) total			

TABLE 13.1 (cont)

COSTS AND EFFECTS OF ALTERNATIVE AREAWIDE PLANS

	Alternative Plans		
Significant Effects	**P-1**	**P-2**	**P-3**
4. Environmental Effects			
A. Hydrology (surface and groundwater)			
(1) water quality			
(2) water quantity			
(3) water uses			
(4) flood hazards			
B. Biology			
(1) rare and endangered species			
(2) wildlife habitats			
C. Air quality			
D. Land			
(1) amount of growth			
(2) type of growth			
(3) intensity of growth			
(the above should be related to the 208 land use plan)			
(4) soil erosion damage			
(5) significant environmentally sensitive areas			
E. Energy and Resource Use			
(1) energy (power)			
(2) chemicals			
(3) land commitment for planned features			

TABLE 13.1 (cont)

COSTS AND EFFECTS OF ALTERNATIVE AREAWIDE PLANS

	Alternative Plans		
Significant Effects	**P-1**	**P-2**	**P-3**
5. Social and Economic Effects			
A. Changes in economic activity where appropriate			
(1) income per capita			
(2) agriculture			
(3) mining			
(4) manufacturing			
(5) services			
B. Employment changes			
(1) regional availability of skilled manpower for treatment plant operation and monitoring			
(2) dislocation			
C. Dislocation of individuals, businesses, or public services			
D. Public health			
E. Aesthetics			
(1) recreational accessibility and activities			
(2) unique archeological, historical, scientific and cultural areas			
(3) noise pollution			
6. Implementation Feasibility and Reliability			
A. Legal capability			
B. Operational effectiveness			
C. Practicability			
D. Coordinative capacity			
E. Public accountability			
7. Public Acceptability			

TABLE 13.2

LEAST COST PLAN

PLAN ELEMENTS (A summary list of planning, construction, zoning, sludge and effluent disposal, operations, monitoring actions, etc., indicating their geographic sites).

1.
2.
3.
.
.
.

TOTAL COST $____________

IMPACTS

	DESCRIPTION
Economic	
1.	
2.	
3.	
Social	
1.	
2.	
3.	
Environmental	
1.	
2.	
3.	

IMPLEMENTATION

(Institutional and financial issues.)

TABLE 13.3

ALTERNATIVE LEAST COST PLAN MODIFICATIONS

	Least Cost Alternative	Alternative A	Impacts	Cost Increase	Alternative B	Impacts	Cost Increase
Plan Elements							
1.							
2.							
3.							
.							
.							
.							

CHAPTER 14

REPORTS

14.1 Report Structure

The planning report should be structured to contain the following four basic components in the main report:

a. Description of the overall adopted plan and each element of the plan. This information should include each of the specific plan outputs cited in Chapter 4 and the adopted land use plan.

b. Proposed management system for implementation of the plan, including the management agencies to be designated.

c. Proposed program for monitoring the results of the plan implementation on water quality and undertaking the annual review and associated revisions of the plan.

d. Recommendation by the governing bodies of local governments having responsibility for, or which would be affected by, implementation of the plan and having jurisdiction in the planning area as to State certification and EPA approval of the plan.

Supporting information should be appended to the report on the following topics:

a. Preliminary engineering layouts and designs, technical data, and cost estimates for alternative sub-plans and areawide plans.

b. Evaluation and comparison of the direct costs; environmental, social, and economic impacts; implementation feasibility; and other related information of the leading alternative areawide plans.

c. The principal rationale incorporated into the adopted land use plan, including alternative land use plan comparisons.

d. Supplementing engineering feasibility data on the features included in the first stage development of the municipal wastewater facilities portion of the adopted plan. This information should include:

1. Collection system and interceptor configurations, profiles, sizes, and cost breakdowns;

2. Treatment plant data, including site plan, layouts of unit processes, flow charts, and design, and performance data;

3. Combined sewer overflow and storm sewer control measures, including site plan, layouts of processes, flow charts, and design and performance data;

4. Sludge handling and disposal facilities information, including design and performance data, disposal site layouts, and sludge conveyance facilities details;

5. Effluent disposal data, including layouts and profiles of outfalls for either inland surface waters or oceans and descriptions and illustrations of deep well injection facilities or land disposal facilities; and

6. Wastewater reuse facilities data.

e. A summary of the public participation involved throughout the planning process.

14.2 Report on Annual Review of Plan

The adopted plan must be reviewed and updated annually. If substantial revisions result from such reviews, the entire planning report should be reviewed accordingly. Relatively minor revisions resulting from such an update could be documented, if practicable, in an addendum to the initial report.

CHAPTER 15

PLAN SUBMITTAL, REVIEW AND APPROVAL

15.1 Introduction

Each 208 planning agency must submit its areawide waste treatment management plan, including recommendations for management agencies, to the appropriate EPA Regional Administrator within 24 months after the award of the planning grant. This plan must be submitted to EPA through the Governor or State reviewing agency designated by the Governor.

15.2 Local Review and Recommendation

Prior to submitting its plan to EPA through the appropriate Governor or State reviewing agency, the planning agency must provide the governing bodies of local governments having responsibility for, or which would be directly affected by, implementation of the plan and having jurisdiction in the planning area, with an opportunity to comment on the plan and proposed management agencies and make recommendations for approval or disapproval. In the event that a local unit of government fails to provide a recommendation within 30 days of receiving the request, the planning agency may consider that the plan has been favorably recommended by that unit of local government.

The recommendations, whether favorable or unfavorable, are to be forwarded by the planning agency to the Governor in connection with his certification of the initial plan. The local comments are also to be forwarded to the appropriate EPA Regional Administrator when the plan is submitted to EPA by the State.

15.3 State Review and Certification of Approval

When the plan is received by the Governor prior to its submission to EPA, the Governor or the State reviewing agency must review the plan for the necessary certification of approval required by Section 208(b)(3) of the Act. The purpose of the State's review is to determine whether:

1. The plan is in compliance with the provisions of the State basin plan(s) and the State Program prepared under Section 106 of the Act and will be accepted as a detailed portion of the State plans when approved by EPA;

2. The plan is internally consistent with the water quality control needs of the area;

3. The plan is consistent with all State and local legislation, regulations or other requirements or plans regarding land use and protection of the environment; and

4. The plan provides an adequate basis for selection and designation of management agencies to be designated under Section (c) of the Act.

Based on the State's review of the plan and the recommendations received from the local units of government, the Governor must then determine whether to approve or disapprove the plan.

If the Governor approves the plan, he must then forward the plan to the appropriate EPA Regional Administrator with his certification of approval and proposed designation of management agencies. The Governor must also forward the recommendations received from the local units of government.

If disapproval is necessary, that is, if no certification of approval can be issued by the Governor due to failure of the planning agency to comply with one or more of the above provisions, the Governor must notify the appropriate EPA Regional Administrator and the planning agency that the plan is deficient and specify how the plan is to be modified so that it may receive State certification of approval.

15.4 EPA Review and Approval

The appropriate EPA Regional Administrator will be responsible for plan approval. The Regional Administrator's approval of the plan will be based upon (1) the State's certification of approval and proposed designation of management agencies, and (2) EPA's review of the plan submission for conformance with provisions of Sections 201 and 208 of the Act and the requirements set forth in 40 CFR 35, Subpart F, as well as any other applicable regulations. State and local comments and recommendations will also be considered. (Note: EPA will not approve any plan in the absence of proposed designations of management agencies.)

Within 120 days after receiving the plan submittal, the Regional Administrator must:

1. Notify the State(s) and the planning agency of approval of the plan and the proposed management agency designations; or

2. Notify the State(s) and the planning agency that the submittal is deficient in one or more respects and specify the ways in which the submittal must be modified to receive EPA approval. EPA must

also specify the time period allowed for the modifications; or

3. Notify the State(s) and the planning agency that the designation of waste treatment management agencies cannot be approved due to failure to meet the requirements set forth in Section 208 (c)(2) of the Act, thereby delaying further consideration of the plan until the deficiencies are remedied. EPA must also specify the time period allowed for correcting the deficiencies.

GLOSSARY

The Act - Public Law 92-500. "This Act may be cited as the 'Federal Water Pollution Control Act Amendments of 1972.'" (Act, sec. 1).

Base level technology - Minimum level of treatment required by the Act.

Basin - "The term 'basin' means the streams, rivers, and tributaries and the total land and surface water area contained in one of the major and minor basins defined by EPA, or other basin unit as agreed upon by the state(s) and the Regional Administrator." (proposed regulations 40 CFR 130.2(1)).

Best Available Technology (BAT) - "Not later than July 1, 1983, effluent limitations for categories and classes of point sources, other than publicly owned treatment works,...shall require application of the best available technology economically achievable for such category or class, which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants as determined in accordance with regulations issued by the Administrator pursuant to section 304(b)(2) of this Act." (Act, sec. 301(b)(2)(A)).

Best Practicable Control Technology (BPCT) - "Not later than July 1, 1977, effluent limitations for point sources, other than publicly owned treatment works, shall require the application of the best practicable control technology currently available as defined by the Administrator pursuant to section 304(b) of this Act." (Act, sec. 301(b)(1)(A)). This is also referred to as **Best Practicable Technology (BPT)**.

Best Practicable Waste Treatment Technology (BPWTT) - "Waste treatment management plans and practices shall provide for the application of the best practicable waste treatment technology before any discharge into receiving waters, including reclaiming and recycling of water and confined disposal of pollutants so they will not migrate to cause water or other environmental pollution." (Act, sec. 201(b)).

Capital intensive - Measure requiring primarily initial capital outlays for its development and relatively little cost for operation and maintenance.

Combined sewer - "A sewer intended to serve as a sanitary sewer and a storm sewer, or as an industrial sewer and a storm sewer." (40 CFR 35.905-2)

Discharge of pollutants - "The term 'discharge of a pollutant' and the term 'discharge of pollutants' each means (A) any addition of any pollutant to navigable waters from any point source, (B) any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft." (Act, sec. 502(12)).

Effluent limitation - "The term 'effluent limitation' means any restriction established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean, including schedules of compliance." (Act, sec. 502 (11)).

Effluent limited segments - "Any segment where water quality is meeting and will continue to meet applicable water quality standards or where there is adequate demonstration that water quality will meet applicable water quality standards after the application of the effluent limitations required by sections 301(b)(1)(A) and 301(b)(1)(B) of the Act." (proposed regulations, 40 CFR part 131).

Facilities planning - Pertains to "provision for cost-effective, environmentally sound and implementable treatment works which will meet applicable requirements of sections 201(g), 301, and 302 of the Act." (201 guidance, p.3).

Infiltration - "The water entering a sewer system, including sewer service connections, from the ground, through such means as, but not limited to, defective pipes, pipe joints, connections, and manhole walls. Infiltration does not include, and is distinguished from, inflow." (40 CFR 35.905-9).

Inflow - "The water discharged into a sewer system, including service connections, from such sources as, but not limited to, roof leaders, cellar, yard and area drains, foundation drains, cooling water dischargers, drains from spring and swampy areas, manhole covers, cross connections from storm sewers and combined sewers, catch basins, storm waters, surface runoff, street wash waters, or drainage. Inflow does not include, and is distinguished from, infiltration." (40 CFR 35.905-11).

Inplace pollution source - Time build up of pollutant load deposited in a receiving water bed and existing as a load upon that receiving water.

Land use - The physical mode of utilization or conservation of a given land area at a given point in time.

Land use controls - Methods for regulating the uses to which a given land area may be put, including such things as zoning, subdivision regulation, and flood-plain regulation.

Materials balance - An illustration of the principle of conservation of matter; that is, an accounting may be performed of all transfers of mass from one point or state to other points or states, such that the total original mass is entirely accounted for.

Maximum daily load - "Each plan shall include for each water quality segment identified pursuant to sec. 131.203, the total maximum daily loads of pollutants, including thermal loads, allowable for each specific criterion being violated or expected to be violated." (proposed regulations 40 CFR part 131.205).

Navigable waters - "The term 'navigable waters' means the waters of the United States, including the territorial seas." (Act, sec. 502(7)).

1983 goals - Pertains to goals outlined in sec. 101(a) and elsewhere in the Act.

1977 goals - Pertains to the July 1, 1977 milestone set by the Act, particularly in terms of treatment technology and limitations.

Nonpoint source - Generalized discharge of waste into a water body which cannot be located as to specific source, as outlined in Section 304(e) of the Act.

Permits - "The Administration may...issue a permit for the discharge of any pollutant, or combination of pollutants,...upon condition that such discharge will meet either all applicable requirements under sections 301, 302, 306, 307, 308, and 403 of this Act, or prior to the taking of necessary implementing actions relating to all such requirements, such conditions as the Administrator determines necessary to carry out the provisions of this Act. (Act, sec. 402(a)(1)). "The Administrator shall authorize a state, which he determines has the capability of administering a permit program which will carry out the objective of this Act, to issue permits for discharges into the navigable waters within the jurisdiction of such state." (Act, sec. 402(a)(5)). The permit program is a part of the National Pollutant Discharge Elimination System (NPDES).

Planning agency - "The governor...or governors shall...designate each 208 planning area including its boundaries, and for each area a single representative agency to be responsible for the planning....The agency shall be a representative organization whose membership shall include but need not be limited to elected officials of local governments, or their designees, having jurisdiction in the designated planning area." (40 CFR 126.12, 126.13, 126.11).

Planning period - "The period over which a waste treatment management system is evaluated for cost-effectiveness. The planning period commences with the initial operation of the system." (40 CFR Appendix A, d(3)). In this case, the planning period is 20 years.

Planning process - Strategy for directing resources, establishing priorities, scheduling actions, and reporting programs toward achievement of program objectives.

Point source - "The term 'point source' means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or can be discharged." (Act, sec. 502(14)).

Pollutant - "The term 'pollutant' means dredged spoil, soil, solid waste, incinerator residue, sewage,garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water." (Act, sec. 502(6)).

Pretreatment - "The Administrator shall...publish proposed regulations establishing pretreatment standards for introduction of pollutants into treatment works...which are publicly owned for those pollutants that are determined not to be susceptible to treatment by such treatment works or which would interfere with the operation of such treatment works." (Act, sec. 307(b)(1)). "Not later than July 1, 1977,...in the case of discharge into a publicly owned treatment works,...shall require compliance with any applicable pretreatment requirements...under section 307 of this Act." (Act, sec. 301(b)(1)(A)).

Residual waste - Solids removed from wastewater during treatment.

Secondary treatment - "There shall be required...for publicly owned treatment works in existence on July 1, 1977, or approved... prior to June 30, 1974...effluent limitations based upon secondary treatment as defined by the Administrator pursuant to section 304(d)(1) of this Act." (Act, sec. 301(b)(1)(B)). "The Administrator...shall publish...information, in terms of amounts of constituents and chemical, physical, and biological characteristics of pollutants, on the degree of effluent reduction attainable through the application of secondary treatment." (Act, Sec. 304(d)(1)).

State water quality standards - Standards of water quality set by the State for intrastate waters, that shall be at least as stringent as Federal standards and shall further the goals of the Act.

Storm sewer - A sewer intended to carry only storm waters, surface run-off, street wash waters, and drainage." (40 CFR 35.905-22).

Upstream pollutant source - Source of pollutants discharged into the receiving waters which is located upstream from the area of consideration.

Waste load allocation - "A waste load allocation for a segment is the assignment of target loads to point and nonpoint sources so as to achieve water quality standards in the most effective manner." (303 guidelines).

Waste treatment facilities - "Any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature...in addition, ...any other method or system for preventing, abating, reducing, storing, treating, separating, or disposing of municipal waste, including waste in combined storm water and sanitary sewer systems." (Act, sec. 212(2)). Also termed treatment works.

Water quality limited segments - "Any segment where it is known that water quality does not meet applicable water quality standards, and is not expected to meet water quality standards even after the application of the effluent limitations required by sections 301(b)(1)(A) and 301(b)(1)(B) of the Act." (proposed regulations 40 CFR part 131).

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